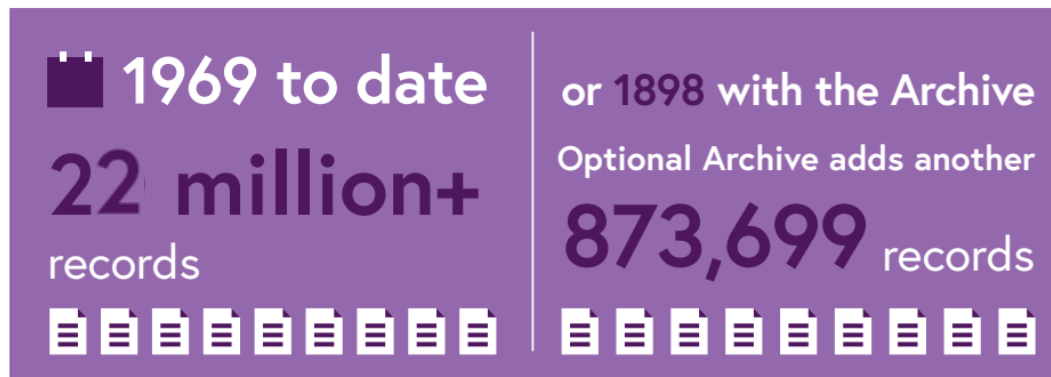
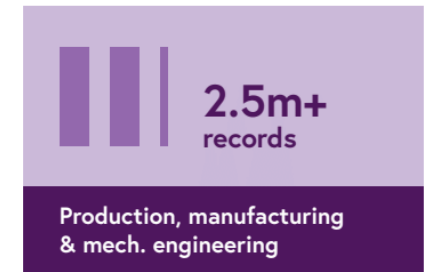
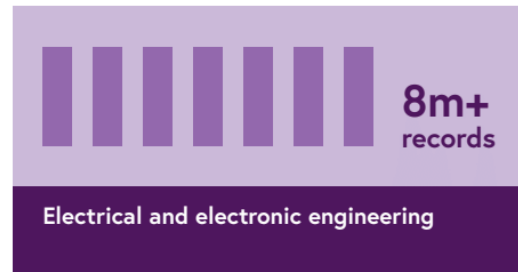
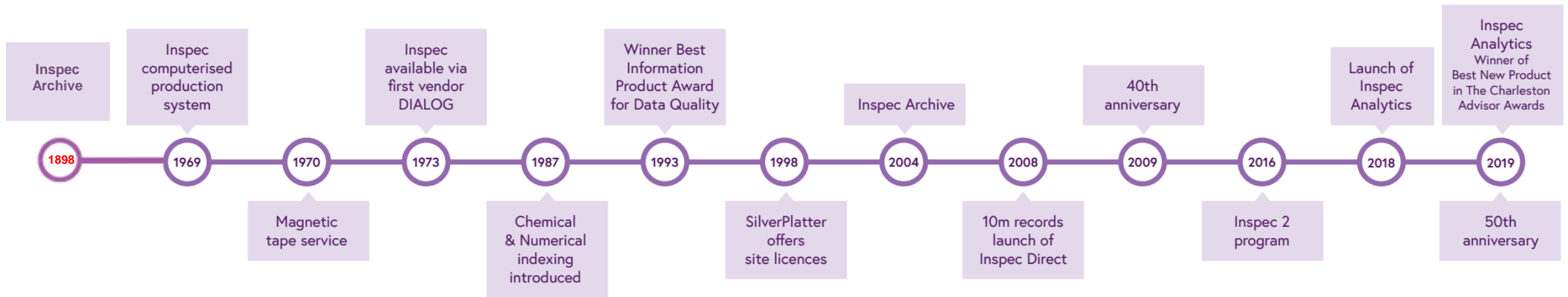


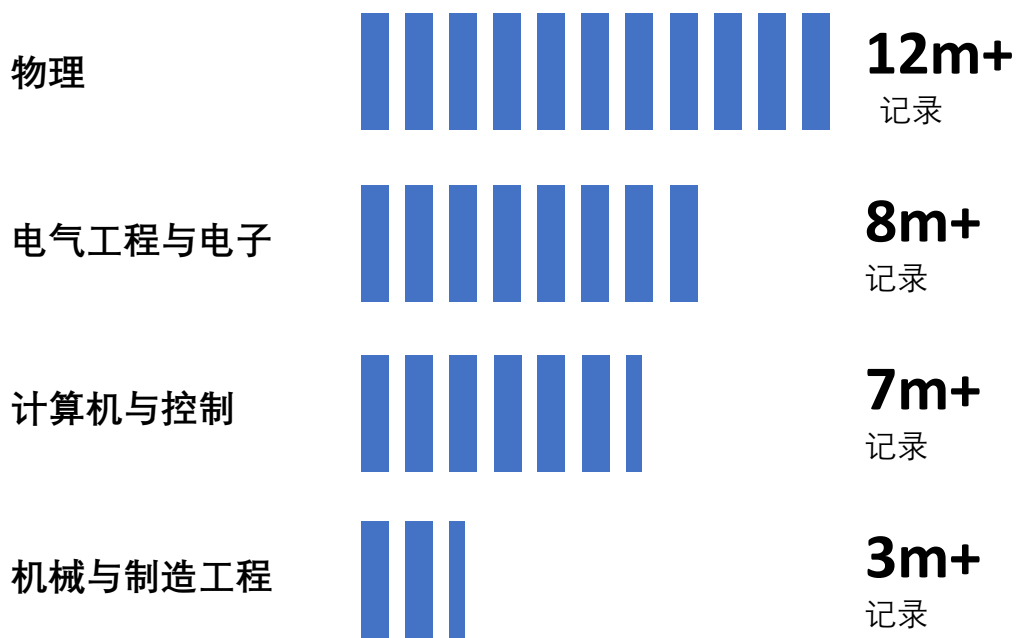
# 精确检索，深度揭示 --Inspec使用技巧分享

IET工程技术学会 刘闯  
2022年5月

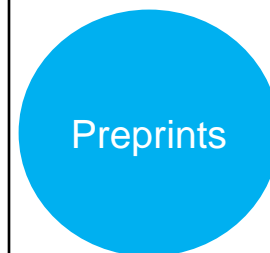
# Supporting the journey to open research



### >22 million 总记录量



可供选择的Inspec Archive (1898-1969), 增加额外的 873,699记录



- ❖ 收录**24万**多条预印本内容, 其中包括:
  - **12.3万**条涉及物理学学科的记录
  - **4.5万**条涉及工程学科的记录

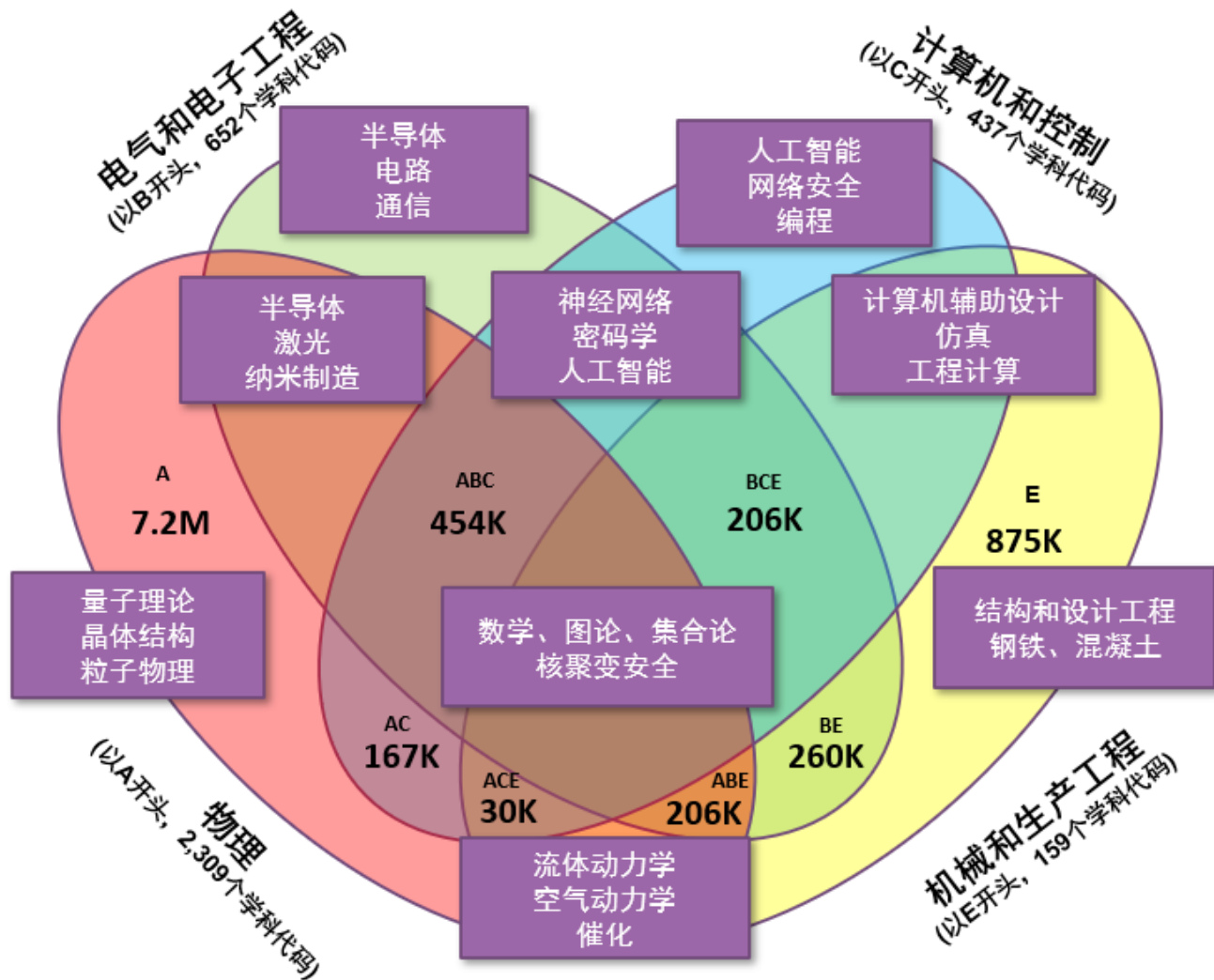


- ❖ 76.1万条中文记录
- ❖ 11.8万条日语记录
- ❖ 6.9万条德语记录
- ❖ 5万条法语记录
- ❖ 3.7万条俄语记录
- ❖ 总计: **100多万**条非英语内容

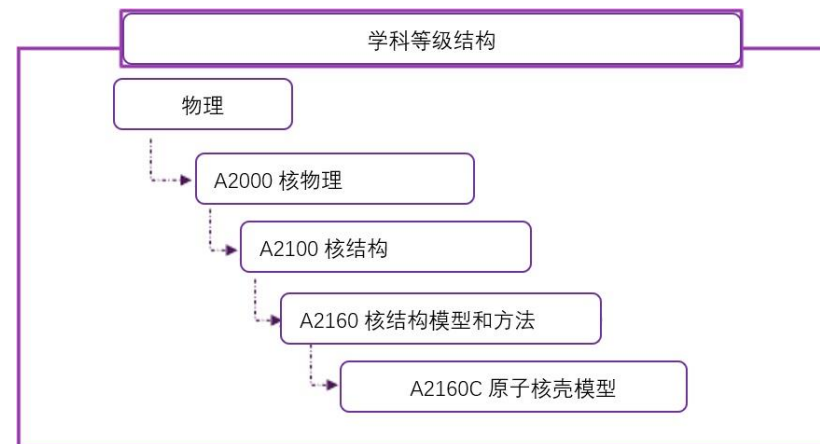


**22M+**文章, 包含来自: **4,500+** 本期刊、**3,000+**会议论文集等

# Inspec数据库的跨学科性



## 5级学科分类及学科分类代码标引



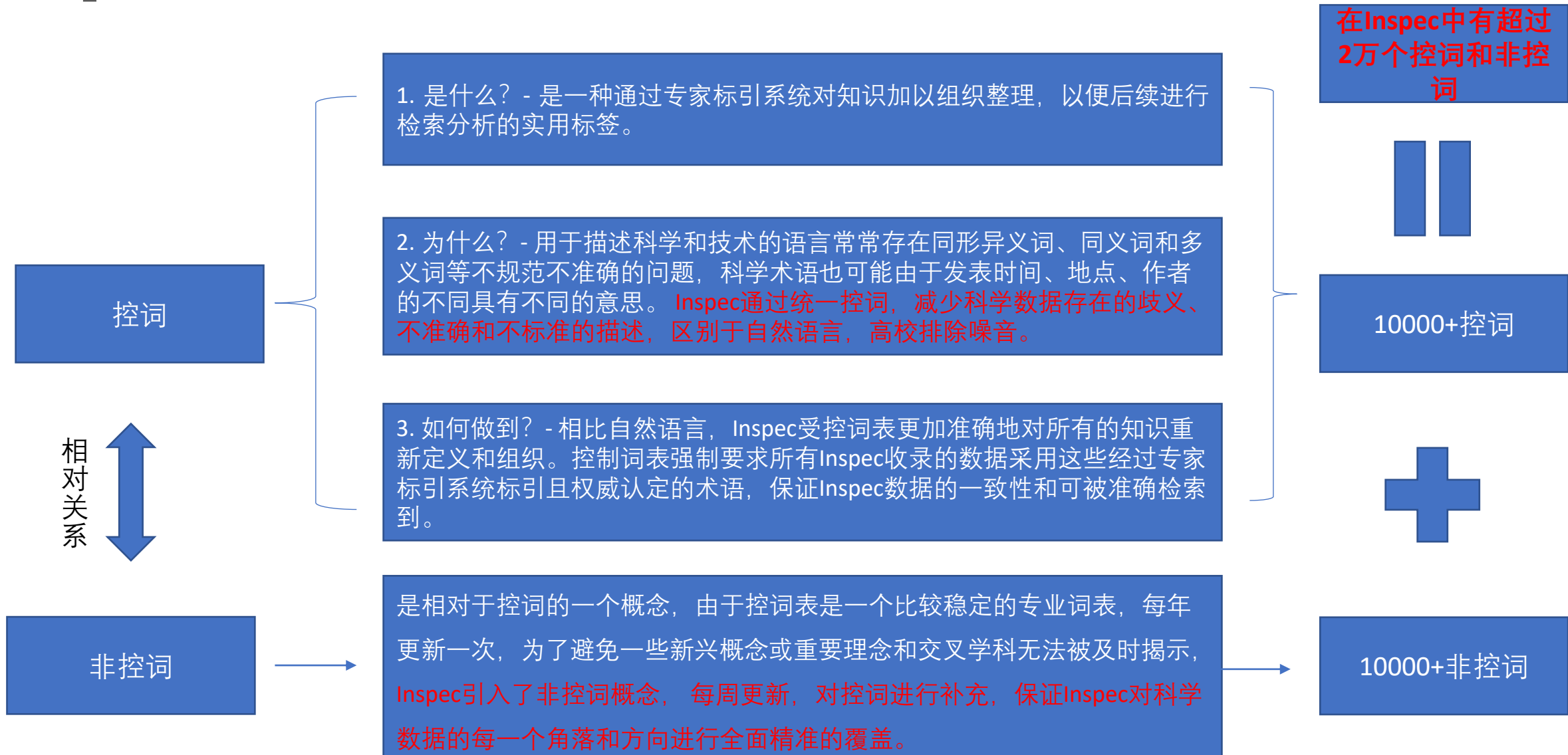
3,570个精准类别

学科代码通常表示如: A2160C, 其中

- A = 数据库的区域, 即物理
- 2 = 分类的最高或最通用的级别, 即核物理
- 1 = 第二级分类, 即核结构
- 60 = 第三级分类, 即核结构模型和方法
- C = 第四或最具体的分类级别

(注: 并不是所有学科代码都有第四级分类)

# Inspec – “控词” 和 “非控词” 索引



# Inspec — 数据库中数据标引介绍 (专家团队人工编加, 精准定位文献)

❖ 控词和非控词索引

❖ 学科分类代码索引

❖ 数值索引

❖ 化学索引

❖ 天文学索引

❖ 文档处理类型索引

❖ IPC国际专利分类号

## HST/WFPC2 snapshot imaging of symbiotic stars

作者: Brocksopp, C.; Bode, M.F.; Eyres, S.P.S.

查看 Web of Science ResearcherID 和 ORCID (由 Clarivate 提供)

Monthly Notices of the Royal Astronomical Society

卷: 344 期: 4 页: 1264-70

DOI: 10.1046/j.1365-8711.2003.06915.x

出版时间: 1 Oct. 2003

文献类型: Journal Paper

### 摘要

The results of a HST/WFPC2 snapshot imaging survey of selected symbiotic stars in 1999/2000 are presented. Seven sources - HD 149427 (PC 11), PU Vul, RT Ser, He2-104 (Southern Crab), V1329 Cyg (HBV 475), V417 Cen and AS 201 - were observed in filters F218W (ultraviolet continuum), F502N ([O III]λ4959, 5007) and F656N (Hαλ6563); an eighth source, RS Oph, was observed in F437N ([O III]λ4363), F502N and F656N. The presence of extended emission was detected in He2-104, V1329 Cyg and possibly HD 149427. In He2-104, we detected the [O III] and Hα counterparts to the inner lobes found in [N II] by Corradi et al. For V1329 Cyg, comparison with previously published HST/FOC results indicates expanding ejecta which may be associated with an ejection event in 1982 (+or-2 yr) at a velocity of 260 +or- 50 km s<sup>-1</sup> in the plane of the sky and at an assumed distance of 3.4 kpc. We also present previously unpublished radio images of HD 149427, which we have obtained from the archives of the Australia Telescope Compact Array and which reveal the presence of extended emission at a similar orientation to that of the possible optical extension. Finally, we also include HST/WFPC2 GO observations of AG Peg and detect possible extended emission in the F218W filter.

### 作者信息

#### 地址:

Brocksopp, C.; Bode, M.F.; Astrophys. Res. Inst., Liverpool John Moores Univ., Birkenhead, UK

### 类别/分类

研究方向: Astronomy & Astrophysics; Instruments & Instrumentation (由 Clarivate 提供)

国际专利分类: H05H1/02 Arrangements for confining plasma by electric or magnetic fields; Arrangements for heating plasma

化学物质索引: N/el; O/el

天文学对象索引: He2-104; V417 Cen; AS 201; AG Peg; HD 149427; PU Vul; RT Ser; V1329 Cyg; RS Oph

学科分类代码: A9780G Cataclysmic binaries; A9710F Circumstellar shells and expanding envelopes; A9710H Mass transfer; A9580J Photographic region astronomical observations; A9580M Space ultraviolet astronomical observations; A9580D Radio, radar, and microwave astronomical observations

CODEN: MNRAAA

受控词表: binary stars; circumstellar matter; stellar photometry; stellar winds; stellarators; symbiotic stars

非受控词表: HST-WFPC2 snapshot imaging; symbiotic stars; ultraviolet continuum; Australia Telescope Compact Array; Hubble Space Telescope; Multielement Radio Linked Interferometer Network; nonthermal radio emission; F218W filter; outflows; winds; 3.4 kpc; N; O

处理类型: Experimental

数值数据索引: galactic distance 3.4E+03 pc

原始文摘信息

Inspec独有字段信息

IPC国际专利分类号

化学索引

天文学索引

学科分类代码

控制词与非控制词

文档处理类型索引

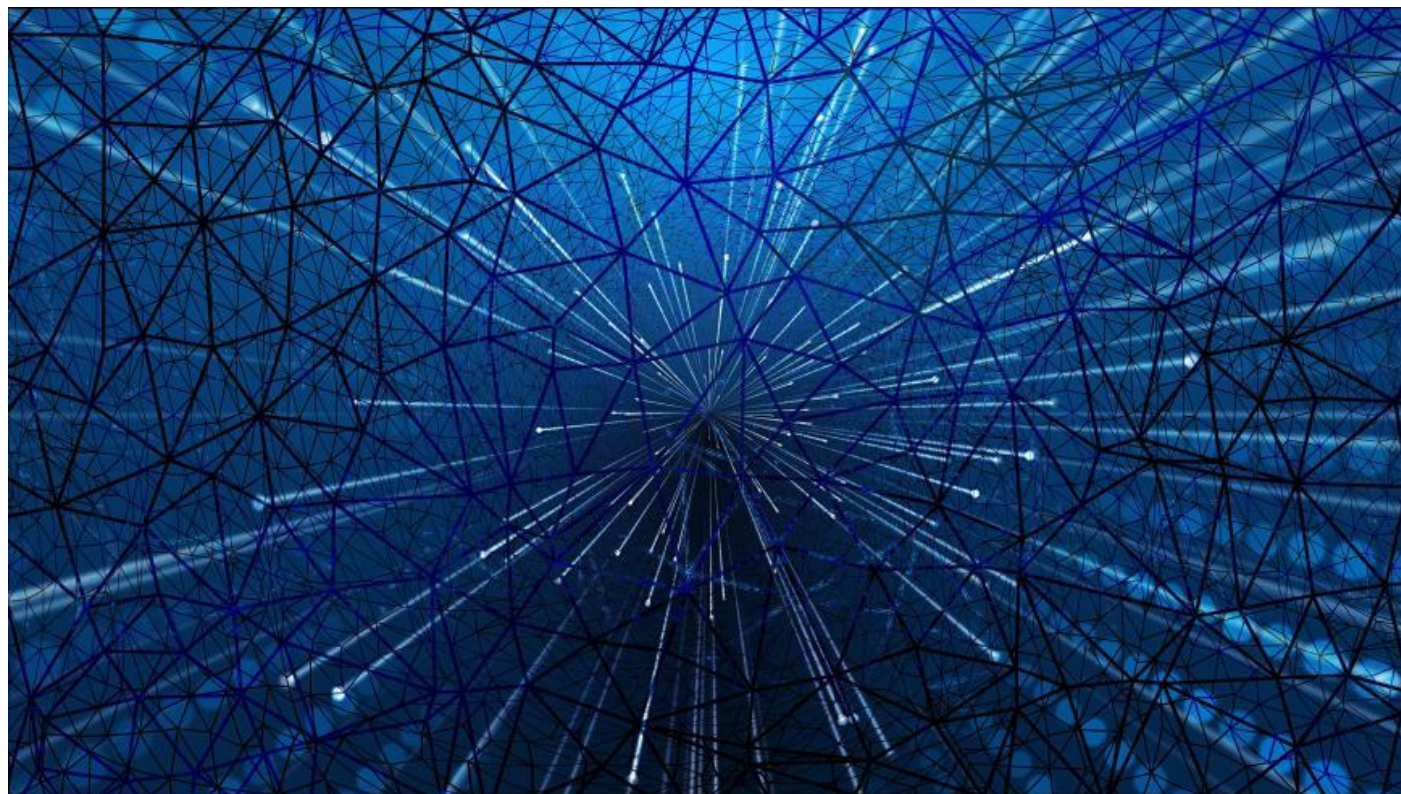
数值索引



❖ 控词和非控词索引

❖ 学科分类代码索引

❖ 文档处理类型索引



课程签到

❖ IPC国际专利分类号

❖ 天文学索引

❖ 化学索引

❖ 数值索引

# Inspec – 数值索引

- 数值检索字段包含文献中涉及物理量参数（47种）。可使用科学计数法（如2.65E+10Hz）和普通计数法(如26500000000Hz)进行数值输入，较大数值建议使用科学计数法，以保证准确。每一个数值索引字段格式 

物理量	数值	单位
-----	----	----

- 检索设置规则:

- ❖ 如果在左侧检索框中输入一个数值，而右侧空缺，表示检索范围为大于或等于左侧输入数值。
- ❖ 如果在右侧检索框中输入一个数值，而左侧空缺，表示检索范围为小于或等于右侧输入数值。
- ❖ 如果在左侧和右侧输入相等的数值，表示检索范围为等于输入数值。
- ❖ 如果两侧输入不同的数据，则表示搜索范围在两者之间。

Inspec – 数值索引包含的物理量及单位		
• 年龄 (年)	• 电子伏特能量 (电子伏特)	• 辐射吸收剂量 (戈雷)
• 海拔 (米)	• 能量 (焦耳)	• 辐射剂量当量 (西弗)
• 视在功率 (伏安)	• 频率 (赫兹)	• 辐射暴露 (库仑每公斤)
• 带宽 (赫兹)	• 增益 (分贝)	• 放射性 (贝克勒尔)
• 比特率 (每秒字节数)	• 银河距离 (秒差距)	• 无功功率 (乏)
• 字节率 (每秒字节数)	• 地心距离 (米)	• 电阻 (欧姆)
• 电容 (法拉)	• 日心距离 (天文单位)	• 尺寸 (米)
• 计算机执行率 (每秒指令数)	• 损失 (分贝)	• 恒星质量 (太阳质量)
• 计算机速度 (每秒浮点运算次数)	• 磁通密度 (特斯拉)	• 存储容量 (字节)
• 电导 (西门子)	• 质量 (公斤)	• 温度 (开尔文)
• 电流 (安培)	• 内存大小 (字节)	• 时间 (秒)
• 深度 (米)	• 噪声系数 (分贝)	• 速度 (米每秒)
• 距离 (米)	• 图片尺寸 (图片元素)	• 电压 (伏特)
• 效率 (百分比)	• 功率 (瓦特)	• 波长 (米)
• 电导率 (西门子每米)	• 压力 (帕斯卡)	• 字长 (字节)
• 电阻率 (欧姆·米)	• 打印机速度 (每秒字符数)	

详情参考: <https://www.theiet.org/media/8804/numerical-data-indexing.pdf>



# Inspec – 化学索引

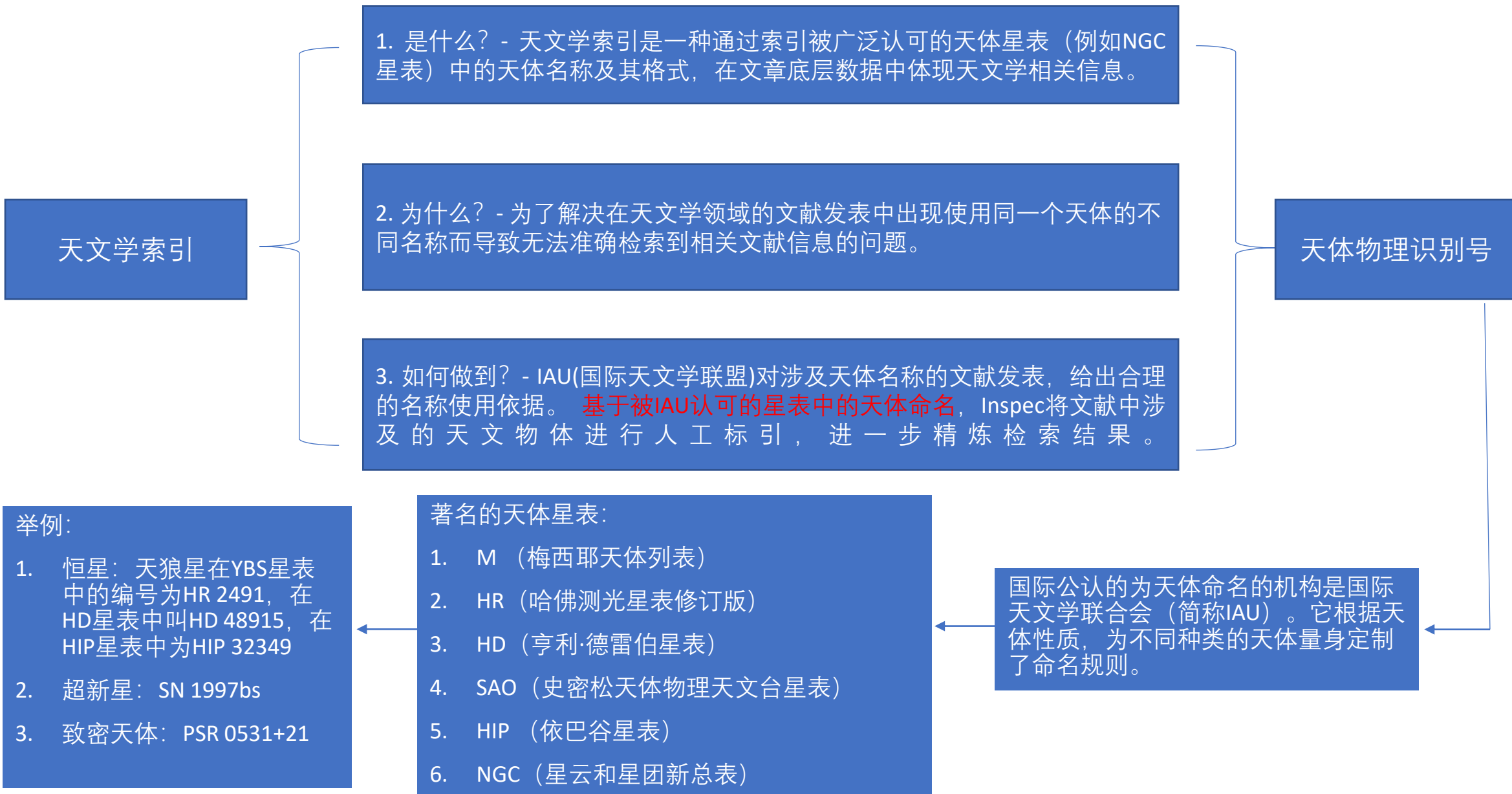
- 化学数据字段包含在文献中讨论的物质和材料系统的受控数据。
- 检索设置:
  1. 输入物质的化学名称(化学符号)
  2. 在化学符号后面附加一个角色
  3. 用/（斜杠）连接化学物质和角色

## 物质角色说明

基本角色	缩写	例子	功能角色 (特殊工艺角色)	缩写	例子
Element (单元素)	EL	Na/el	Adsorbate (吸附物)	ADS	CO/ads
Binary System (双元素)	BIN	GaN/bin	Dopant (掺杂物)	DOP	P/dop
System of >2 components (多于2个元素)	SS	H2SO4/ss	Interface System (界面系统)	INT	Si/int
			Surface/Substrate (表面/基质)	SUR	Fe/sur

详情参考: <https://www.theiet.org/media/5239/chemical-indexing-updated-jan-2020.pdf>

# Inspec –天文学索引



详情参考: <https://www.theiet.org/publishing/inspec/inspec-content-coverage/astronomical-indexing/>

High-Fr

研究方向: Engineering

ble

作者: Gu

IEEE TRA

卷: 33 第

DOI: 10.1

出版时间

已索引: :

文献类型

摘要

Transform

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关键词

作者关键

Keyword:

作者信息

通讯作者

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地址:

▼ 1 SI

2 Tr

3 W

4 H

电子邮件

类别/分

研究方向: Engineering

国际专利分类 来自 Inspec®

查看记录 Inspec®

国际专利分类: H01F27/00 Details of transformers or inductances, in general; H01F27/28 Coils; Windings; Conductive connections; H02H3/20 Responsive to excess voltage; H02H9/04 Responsive to excess voltage

学科分类代码 来自 Inspec®

查看记录 Inspec®

学科分类代码: B8350 Transformers and reactors; B0220 Mathematical analysis; B8140 Power system protection; C3340H Control of electric power systems; C1120 Mathematical analysis

CODEN 来自 Inspec®

查看记录 Inspec®

CODEN: ITPDE5

受控词表 来自 Inspec®

查看记录 Inspec®

受控词表: earthing; equivalent circuits; overvoltage protection; power cables; time-domain analysis; transfer functions; transformer windings

非受控词表 来自 Inspec®

查看记录 Inspec®

非受控词表: ground fault initiation; feeding cable; transformer terminal equivalents; admittance measurements; high-frequency transient interaction; terminal equivalent approach; voltage transfer function model; internal points; three-winding transformer; tap setting; additional common-mode measurements; ungrounded tertiary winding; time-domain simulation; ground-fault initiation results; resonant voltage; peak value; resonant overvoltage; unfavorable network conditions; selected tap position; terminal behavior; high-frequency resonant overvoltages; transformer regulating winding

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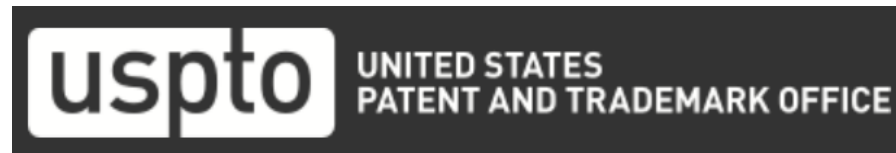
集

Expanded (SCI-

# Inspec 全球产品研发支持



Seeing beyond



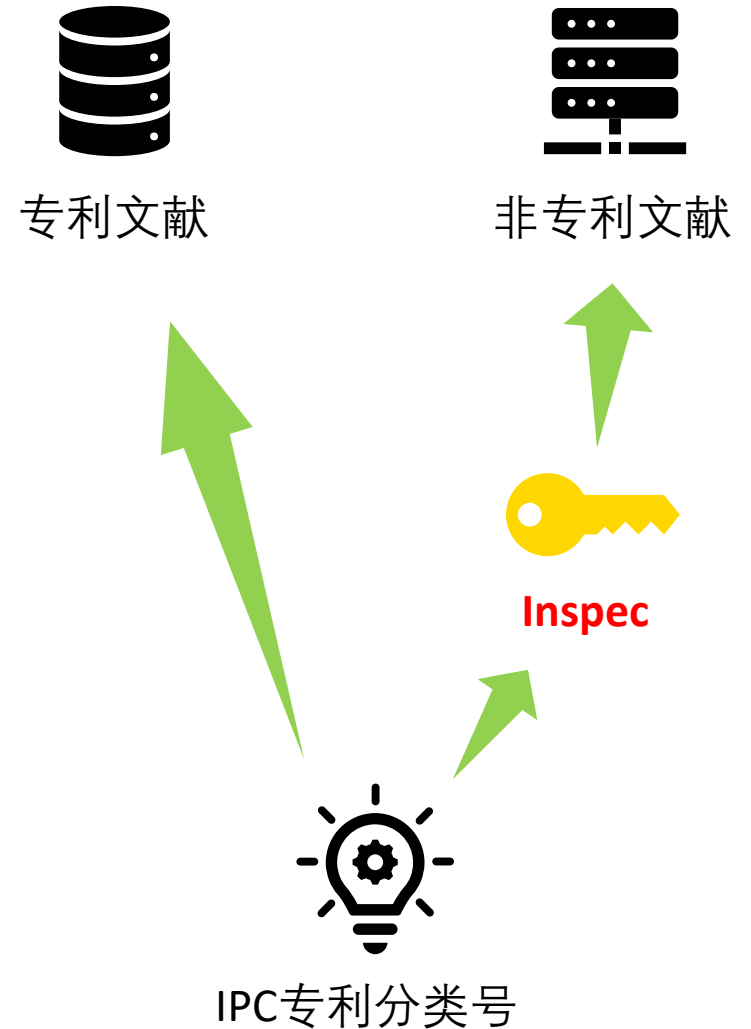
# 非专利文献检索

Within the EPO, searching within NPL databases forms an important part of the daily work of the patent examiner. The importance of NPL cannot be ignored, especially not in technical fields as biotechnology, pure and applied chemistry, telecommunication, computers and audiovisual media. Each technical field has its own dedicated sources of NPL and it imparts to the searcher to select the proper databases depending on the topic that needs to be searched.

在欧洲专利局的日常工作体系中，在非专利文献检索（NPL）数据库中搜索是专利审查员日常工作的重要组成部分。非专利文献检索的重要性不容忽视，尤其是在生物技术、纯化学和应用化学、远程通信、计算机和视听媒体等高技术领域。每个专业技术领域都有自己专用的NPL来源，检索人员根据自身的研究主题选择合适的数据库。

[Verbandt, Vadot, 2018](#) Y. Verbandt, E. Vadot  
**Non-patent literature search at the European Patent Office**  
World Patent Inf., 54 (2018), pp. S72-S77

1996年，Yves Verbandt 在布鲁塞尔自由大学（比利时）获得光子学博士学位。他在布鲁塞尔自由大学的研究生学习涉及心肺生理学和远程医疗。2001年，他加入欧洲专利局，担任导波光学领域的专利审查员。





# Inspec收录文章 IPC codes 底层数据标引

国际专利分类 (IPC)  
欧洲专利分类号(ECLA)  
美国专利分类号 (CCL)  
日本的分类法 (FI/F-term)  
联合专利分类 (CPC)  
...

These codes are used with the kind permission of the World Intellectual  
Property Organization

- **A部** – 人类生活必需 (农、轻、医)
- **B部** – 作业、运输
- **C部** – 化学、冶金
- **D部** – 纺织、造纸
- **E部** – 固定建筑物 (建筑、采矿)
- **F部** – 机械工程
- **G部** – 物理
- **H部** – 电学

\*每条记录都标引IPC专利分类信息

\*配合文章处理类型中包含的“new development”使用，可以快速定位专利相关文献

\*随着CPC分类的更多应用，Inspec也在考虑将CPC引入底层数据标引中

研究人员

图情团队

工程领域从业人员

科研管理

## 改善协作

- 探索协作网络资源
- 寻找合作者或领域内专家
- 衡量合作的影响和有效性

## 竞争情报

- 查明竞争对手——谁在研究什么
- 发现相关研究和创新的新兴、增长或利基领域
- 分析发展趋势并探索互补的研究领域

## 明确研究优势

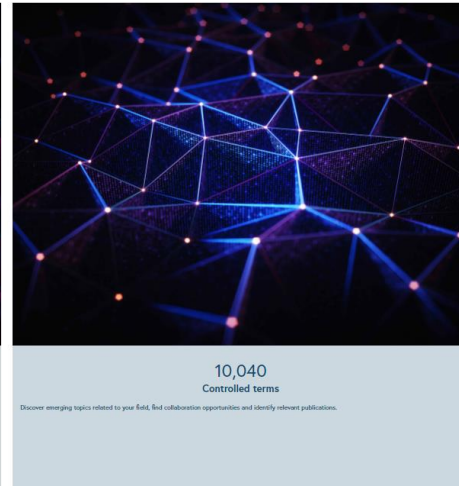
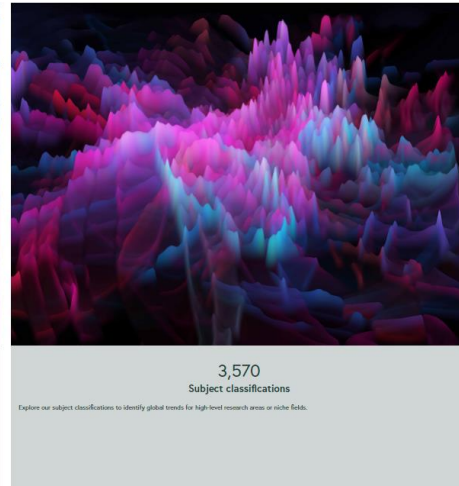
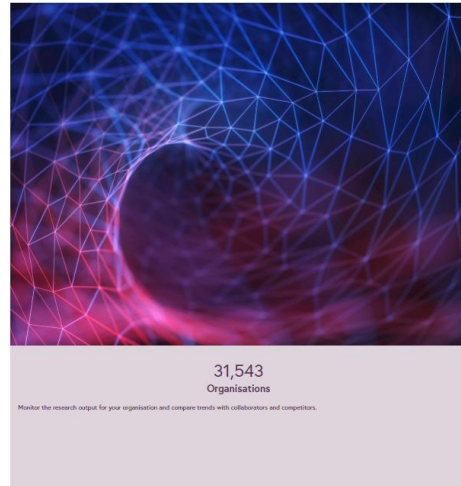
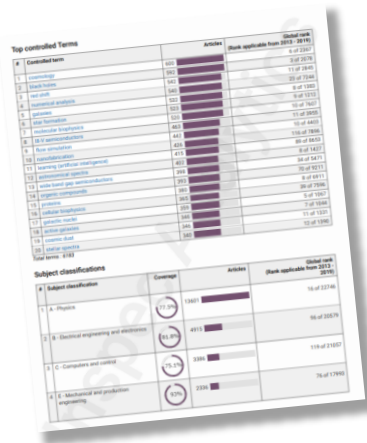
- 在全球范围内对研究成果进行基准测试和评估
- 支持IP商业化/知识转移
- 评估机构的影响

## 为战略决策提供信息

- 确定研究重点，分配研究资源
- 定义研究计划以最大限度地提高研究影响和创新



# 为什么选择 *Inspec Analytics*?



## 揭开全球工程研究格局

由 *Inspec* 提供支持：权威内容确保可信度、准确性和数据质量

直观的揭示：易操作的界面、可导出的报告和可视化使研究分析直观而高效

精确分析：获取详细而细致的研究情报，为战略决策提供信息

全面覆盖：（31,543个机构）（3,570个学科分类）（10,040个受控术语）

新功能：引用评价值（Citation level score），通过机构平均引用水平与全球平均引用水平的对比，直观了解该机构在各细分领域的影响力水平。

# 案例一：Web of Science平台

课题描述：高压大功率绝缘栅双极型晶体管（**Insulated Gate Bipolar Transistor**，简称**IGBT**）在电力、能源、交通、高端制造等领域有着重要的应用，科技意义、社会经济效益巨大。在新能源汽车领域，IGBT广泛应用于**交流和直流电的转换**（主逆变器、充电桩等）、**电压的高低转换**（高低压直流逆变器等）等场景中。

本案例将以**碳化硅**、**400-1200V** 工作电压的IGBT的在**直流交流电源转换器、逆变器**（DC AC converters inverters）中的研究为课题，介绍Inspec数据库在文献检索中的特点及其查全、查准、高效的文献检索的优势和对潜在专利领域分析的功能。

根据课题描述，关键信息和参数如下：

- ✓ 绝缘栅双极型晶体管(Insulated Gate Bipolar Transistor)
- ✓ 电压（400V-1200V）
- ✓ 碳化硅（SiC）
- ✓ 直流交流电源转换器、逆变器（DC AC converters inverters）



# 文献检索与分析逻辑

## ❖ INSPEC Analytics-研究领域概览

- 在Inspec Analytics中快速概览绝缘栅双极型晶体管 “Insulated Gate Bipolar Transistors” 的研究进展，包含文章数量、被引数据、研究机构、发文期刊和学术会议等信息。

## ❖ 检索策略

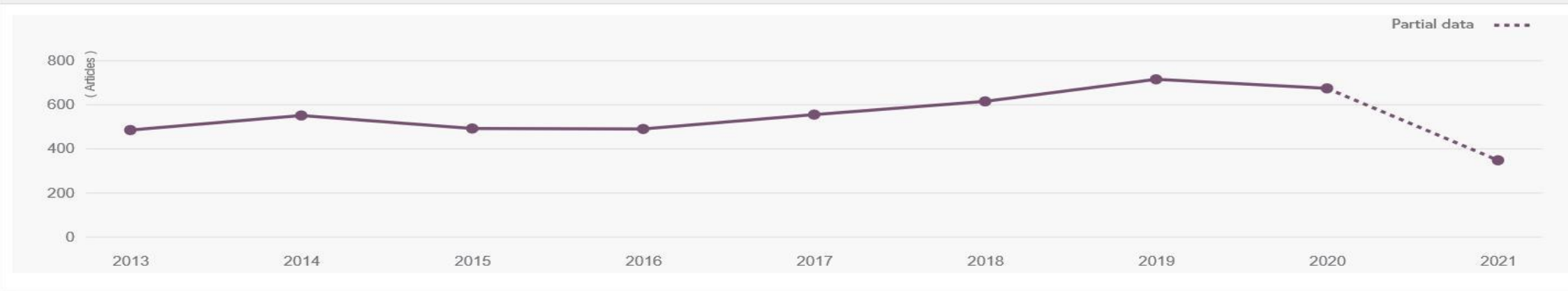
- 步骤1: 利用INSPEC数据库中独特的学科代码、化学检索和数值检索，快速精准锁定文献范围。
  - A. 主题字段中选择绝缘栅双极型晶体管 Insulated Gate Bipolar Transistors
  - B. 化学检索：碳化硅（SiC）
  - C. 数值检索：电压（400-1200 V）
  - D. 学科分类代码：（直流 交流功率转换器 逆变器） DC AC power converters invertors
  - E. 控制词：新能源汽车（xEV）

**备注：本检索案例在Web of Science平台Inspec数据库中演示。**



1. “insulated gate bipolar transistors”作为控词索引，历年的文章数量进展（2013年-2020年）。  
数据来源：Inspec Analytics 详见[https://inspec-analytics-app.theiet.org/#/controlled\\_terms/8067](https://inspec-analytics-app.theiet.org/#/controlled_terms/8067)

Controlled term over time



2. 2013年到2021年与上述控词相关的文章总量。

**4,907**

articles published with this Controlled term between  
2013 - 2021

[Show articles](#)

3. 2020年比2013年，与上述控词相关的文章数量增加39.13%。

Between

**2013 - 2020**

article output increased

**39.13%** ▲

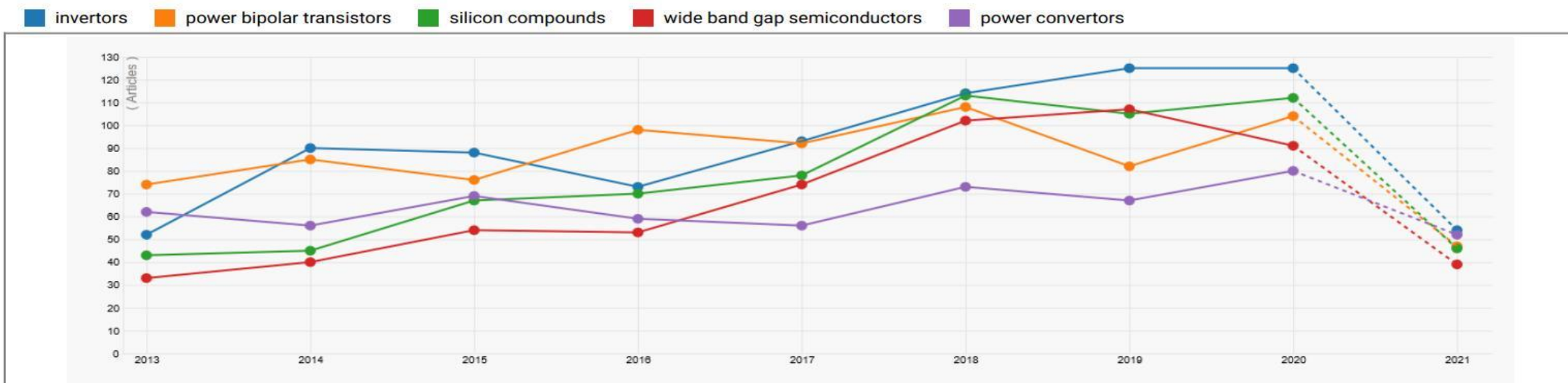
4. 2013年到2021年之间，上述控词相关的文章总被引为2803次，篇均被引0.57次。(备注：指在Inspec数据库收录范围内的引用与被引用，也称作“小同行引用”—在特定相关学科、研究领域内的文献引用。引用和施引文献属于“同行”。Inspec的引用与篇被引数据均将引用和施引文献范围限定物理与工程学科范围内)

## Co-occurring controlled terms for insulated gate bipolar transistors [view online](#)

Report showing 1 to 25 of total 1810 Controlled terms

Search :

- Date range  
2013 to 2021
- Sort by  
Count (descending)



备注: **Co-occurring Controlled Terms (并发控词)** : 与所选“控制词”经常共同在文章中出现的其他“控制词” (按照文章数量排序).

5. 分析“insulated gate bipolar transistors”的并发控词发文数量, 发现“insulated gate bipolar transistors”主要应用于逆变器、电力转换器等 (发文量均呈现逐年上升趋势); 涉及硅基材料的工艺技术; 也会涉及宽禁带半导体领域。

### TOP机构

Organisations	
1. Aalborg Universitet Aalborg, Denmark academic	184
2. University of Electronic Science and Technology of China Chengdu, China academic	145
3. Infineon Technologies AG Neubiberg, Germany corporate	127
Total organisations : 1283	

### 期刊

Journal	
1. IEEE Transactions on Power Electronics	250
2. Microelectronics Reliability	135
3. IEEE Transactions on Electron Devices	114
4. IEEE Transactions on Industrial Electronics	76
5. IEEE Journal of Emerging and	74
Total journals : 312	

### 会议

Conference	
1. 2013 15th European Conference on Power Electronics and Applications (EPE)	40
2. 2015 17th European Conference on Power Electronics and Applications (EPE'15 ECCE-Europe)	38
3. PCIM Europe - International Exhibition and Conference for	37
Total conferences : 929	

### 并发控词

Controlled terms	
4. wide band gap semiconductors	593
5. power convertors	574
6. semiconductor device models	554
7. semiconductor device reliability	465
8. switching convertors	421
9. power semiconductor switches	376
10. silicon	324
Total terms : 1810	

### 学科分类和学科代码

Subject classifications	
3. B2560 - Semiconductor devices	4171
4. B2560R - Insulated gate field effect transistors	3790
5. B2560J - Bipolar transistors	3632
6. B8000 - Power systems and applications	2537
7. B8300 - Power apparatus and electric machines	2345
8. B8360 - Power convertors and power supplies to apparatus	2112
9. B1000 - Circuit theory and circuits	1719
Total classifications : 864	

备注: 并发控制词为与该控制词研究领域相关的其他控制词领域, 根据文章数量排序。

# A. 主题字段中选择绝缘栅双极型晶体管 Insulated Gate Bipolar Transistors

Discover multidisciplinary content  
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DOCUMENTS RESEARCHERS

Search in: **Inspec®** ^

- All Databases
- Web of Science Core Collection
- Biological Abstracts
- BIOSIS Citation Index
- Chinese Science Citation Database™
- Data Citation Index
- Derwent Innovations Index
- Inspec®**
- KCI-Korean Journal Database
- MEDLINE®

**Inspec® (1898-present)**  
A comprehensive index to the global journal and proceedings literature in physics, electrical/electronic engineering, computing, control engineering, mechanical engineering, production and manufacturing engineering, and information technology.

- Search using the unique Inspec Thesaurus and Classification Codes as well as chemical, numerical, and astronomical indexing.

Data updated 2022-03-16

1. 在WoS平台选择Inspec数据库，以使用所有功能。
2. 选择“主题词”字段，并输入主题词（请考虑主题词在发文习惯中是否存在简写、单复数表示，以便在第一步取得最全的检索。）

16,128 results from Inspec® for:

Q "IGBT" or "insulated gate bipolar transistors" (Topic)

Analyze Results Create Alert

Topic Example: Radioactive Decay  
"IGBT" or "insulated gate bipolar transistors"

+ Add row + Add date range Advanced Search

X Clear Search

Quick Filters

Open Access 1,128

(对文章中的化学元素及其在文章中涉及的材料工艺进行标引)

- 化学数据字段包含在文献中讨论的物质和材料系统的受控数据。
- 检索设置:
  1. 输入物质的化学名称(化学符号)
  2. 在化学符号后面附加一个角色
  3. 用/ (斜杠) 连接化学物质和角色

为什么Inspec引入工人标引的化学索引?

Mercury (element)

Mercury (planet)

## 物质角色说明

基本角色	缩写	例子	功能角色 (特殊工艺角色)	缩写	例子
Element (单元素)	EL	Na/el	Adsorbate (吸附物)	ADS	CO/ads
Binary System (双元素)	BIN	GaN/bin	Dopant (掺杂物)	DOP	P/dop
System of >2 components (多于2个元素)	SS	H2SO4/ss	Interface System (界面系统)	INT	Si/int
			Surface/Substrate (表面/基质)	SUR	Fe/sur

详情参考: <https://www.theiet.org/media/5239/chemical-indexing-updated-jan-2020.pdf>



## B. 化学检索：碳化硅 (SiC)

16,128 results from Inspec® for:

Q "IGBT" or "insulated gate bipolar transistors" (Topic)

Analyze Results Create Alert

Topic Example: Radioactive Decay "IGBT" or "insulated gate bipolar transistors"

+ Add row + Add date range Advanced Search

X Clear Search

化学标引消除超90%的检索噪音

1,344 results from Inspec® for:

Q "IGBT" or "insulated gate bipolar transistors" (Topic) and SiC/bin (All Chemical Roles)

Analyze Results Create Alert

Topic Example: Radioactive Decay "IGBT" or "insulated gate bipolar transistors"

And All Chemical Roles Example: Pd/el SiC/bin

+ Add row + Add date range Advanced Search

小结:

1. 选择“化学索引”字段，并输入SiC以及SiC在IGBT中涉及到的基本角色或功能角色。
2. 本案例中SiC在IGBT的研究中，SiC的基本化学角色是二元化合物。

- 数值检索字段包含文献中涉及物理量参数。可使用科学计数法（如2.65E+10Hz）和普通计数法(如26500000000Hz)进行数值输入，较大数值建议使用科学计数法，以保证准确。每一个数值索引字段格式包含：

物理量	数值	单位
-----	----	----

- Inspec数值索引包含47个物理量

- 检索设置规则:

- ❖ 如果在左侧检索框中输入一个数值，而右侧空缺，表示检索范围为大于或等于左侧输入数值。
- ❖ 如果在右侧检索框中输入一个数值，而左侧空缺，表示检索范围为小于或等于右侧输入数值。
- ❖ 如果在左侧和右侧输入相等的数值，表示检索范围为等于输入数值。

Inspec – 数值索引包含的物理量及单位		
• 年龄 (年)	• 电子伏特能量 (电子伏特)	• 辐射吸收剂量 (戈雷)
• 海拔 (米)	• 能量 (焦耳)	• 辐射剂量当量 (西弗)
• 视在功率 (伏安)	• 频率 (赫兹)	• 辐射暴露 (库仑每公斤)
• 带宽 (赫兹)	• 增益 (分贝)	• 放射性 (贝克勒尔)
• 比特率 (每秒字节数)	• 银河距离 (秒差距)	• 无功功率 (乏)
• 字节率 (每秒字节数)	• 地心距离 (米)	• 电阻 (欧姆)
• 电容 (法拉)	• 日心距离 (天文单位)	• 尺寸 (米)
• 计算机执行率 (每秒指令数)	• 损失 (分贝)	• 恒星质量 (太阳质量)
• 计算机速度 (每秒浮点运算次数)	• 磁通密度 (特斯拉)	• 存储容量 (字节)
• 电导 (西门子)	• 质量 (公斤)	• 温度 (开尔文)
• 电流 (安培)	• 内存大小 (字节)	• 时间 (秒)
• 深度 (米)	• 噪声系数 (分贝)	• 速度 (米每秒)
• 距离 (米)	• 图片尺寸 (图片元素)	• 电压 (伏特)
• 效率 (百分比)	• 功率 (瓦特)	• 波长 (米)
• 电导率 (西门子每米)	• 压力 (帕斯卡)	• 字长 (字节)
• 电阻率 (欧姆·米)	• 打印机速度 (每秒字符数)	

详情参考：<https://www.theiet.org/media/8804/numerical-data-indexing.pdf>

## C. 数值检索：电压（400-750 V）

1,344 results from Inspec® for:

Q "IGBT" or "insulated gate bipolar transistors" (Topic) and SiC/bin (All Chemical Roles) Analyze Results Create Alert

Topic  "IGBT" or "insulated gate bipolar transistors" ×

And   SiC/bin ×

+ Add row + Add date range Advanced Search

258 results from Inspec® for:

Q "IGBT" or "insulated gate bipolar transistors" (Topic) and SiC/bin (All Chemical Roles) and 400 1200 (Voltage (Volt)) Analyze Results Create Alert

Topic  "IGBT" or "insulated gate bipolar transistors" ×

And   SiC/bin ×

And   400 to  1200 ×

数值索引进一步将检索“噪音”消除到99%

小结：

1. 选择“数值索引”字段，并输入课题研究涉及的物理量及其数值范围。

# D. 学科分类索引: DC AC power converters invertors

## 直流交流电源转换器逆变器

43 results from Inspec® for:

Q "IGBT" or "insulated gate bipolar transistors" (Topic) and SiC/bin (All Chemical Roles) and 400 1200 (Voltage (Volt))

Analyze Results Create Alert

Refined By: Classifications: Dc Ac Power Convertors Invertors X Clear all

Copy query link

Publications You may also like...

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Publication Years

0/43 Add To Marked List Export

Sort by: Citations: highest first 1 of 1

1 Design and Comparison of a 10-kW Interleaved Boost Converter for PV Application Using Si and SiC Devices 41 Citations

Chandra Mouli, G.R.; Schijffelen, J.H.; (...); Zeman, M.  
June 2017 | IEEE Journal of Emerging and Selected Topics in Power Electronics 5 (2) , pp.610-23

Grid-connected photovoltaic (PV) inverters have a dc/dc converter connected to the PV for executing the maximum power point tracking. The design of an interleaved boost converter (IBC) with three switching legs for a 10-kW PV inverter is presented in this paper. This paper shows how the use of silicon carbide (SiC) switches and powdered iron core inductors enables the operation of the converter ... Show more

Full Text at Publisher

31 References

Related records ?

小结:

1. 通过Inspec学科分类代码, 精炼出与DC AC power converters invertors相关的文献。

## D. 控制词: xEV

11 results from Inspec® for:

Q "IGBT" or "insulated gate bipolar transistors" (Topic) and SiC/bin (All Chemical Roles) and 400 1200 (Voltage (Volt))

Analyze Results

Create Alert

Refined By: Classifications: Dc Ac Power Convertors Invertors X Controlled Terms: Electric Vehicles or Electric Drives or Automotive Electric Vehicles or Electric Vehicle Charging or Hybrid Electric Vehicles or Electric Propulsion X Clear all

Copy query link

Publications

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0/11

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Sort by: Citations: highest first v < 1 of 1 >

1 A compact 110 kVA, 140degC ambient, 105degC liquid cooled, all-SiC inverter for electric vehicle traction drives

[Olejniczak, K.](#); [Flint, J.](#); (...); [McNutt, J.](#)

2017 IEEE Applied Power Electronics Conference and Exposition (APEC)

2017 | 2017 IEEE Applied Power Electronics Conference and Exposition (APEC) , pp.735-42

Wide bandgap materials are having a transformational impact on the electrical, thermal, and mechanical performance of military, industrial, and commercial power electronic systems where silicon (Si) power semiconductors are the present material technology of choice. This paper reports on the design, analysis, and experimental verification of a compact all-silicon carbide (SiC)-based inverter to ... Show more

14

Citations

8

References

小结:

1. 通过Inspec人工标引的控制词, 进一步精炼出与电动汽车相关的文献。

# D. 国际专利分类代码: 非专利文献检索来发现潜在专利领域

## Fast switching SiC cascode JFETs for EV traction inverters

By: Ruizhu Wu; Gonzalez, J.O.; Davletzhanova, Z.; Mawby, P.; Alatise, O.

View Web of Science ResearcherID and ORCID (provided by

2020 IEEE Applied Power Electronics Conference and Exposition

Page: 3489-96

DOI: 10.1109/APEC39645.2020.9124052

Published: 2020

Indexed: 2020-07-31

Document Type: Conference Paper

### Conference

Meeting: 2020 IEEE Applied Power Electronics Conference and Exposition (APEC)

Location: New Orleans, LA, USA

Date: 15-19 March 2020

Sponsor: IEEE Power Electron. Soc.

### Abstract

This paper investigates the potential performance of high speed SiC cascode JFETs in EV traction inverters with high switching frequencies. Traction inverters implemented with SiC devices have shown improved energy conversion efficiency compared to IGBT based traction inverters however SiC MOSFETs suffer from unstable threshold voltage due to charge trapping at the SiC/SiO<sub>2</sub> (due to high density of traps). Since SiC cascode JFETs combine low voltage silicon MOSFETs (at the input) with high speed/high-power density SiC JFETs (at the output), cascode JFETs combine the electrical gate oxide reliability of silicon devices with the power density of SiC. This paper simulates an EV driving cycle using experimental power loss measurements (at different currents and temperatures) of commercially available 650V SiC cascode JFETs and SiC MOSFETs. The inverter has been simulated at 10, 25 and 50 kHz to investigate the impact of increased switching frequency on device losses. The model is fully electrothermal since conduction and switching losses have been measured at different junction temperatures and used as inputs to the model. The results show the potential of superior performance of the SiC cascode JFET in terms of power loss and junction temperature swings. Furthermore, since higher switching frequencies might be desirable in future high-speed traction motors, the fast switching and low loss performance of SiC Cascode JFETs becomes more attractive.

### Author Information

#### Addresses:

Ruizhu Wu; Gonzalez, Jose Ortiz; Davletzhanova, Zarina; Mawby, Philip; Alatise, Olayiwola; Sch of Eng., Univ. of Warwick, Coventry, UK

### Categories/Classification

Research Areas: Energy & Fuels; Engineering (provided by Clarivate)

**International Patent Classification:** B60L Electric equipment or propulsion of electrically-propelled vehicles; Magnetic suspension or levitation for vehicles; Electrodynamic brake systems for vehicles, in general; B60L1/00 Supplying electric power to auxiliary equipment of vehicles; B60M3/00 Feeding power to the supply lines in contact with collector on vehicles; Arrangements for consuming regenerative power; H01H Electric switches; Relays; Selectors; Emergency protective devices; H01L29/66 Types of semiconductor device; H02M Apparatus for conversion between ac and ac, between ac and dc, or between dc and dc, and for use with mains or similar power supply systems; Conversion of dc or ac input power into surge output power; Control or regulation thereof; H02M7/00 Conversion of ac power input into dc power output; Conversion of dc power input into ac power output; H01L29/772 Field-effect transistors

**Chemical Indexing:** SiC-SiO2/int SiO2/int SiC/int O2/int Si/int C/int O/int SiO2/bin SiC/bin O2/bin Si/bin C/bin O/bin

**Subject Classification codes:** B8520 Transportation; B8360N DC-AC power converters (invertors); B0170N Reliability; B1210 Power electronics, supply and supervisory circuits; B2180B Relays and switches; B2560P Power semiconductor devices; B2560S Other field effect devices

**Controlled Terms:** electric vehicles; field effect transistor switches; interface states; invertors; power semiconductor switches; semiconductor device reliability; silicon compounds; traction motors; traction power supplies; wide band gap semiconductors

**Uncontrolled Terms:** EV traction inverters; high switching frequencies; IGBT based traction inverters; high-speed traction motors; fast switching silicon carbide cascode JFET; high speed silicon carbide cascode JFET; low voltage silicon MOSFET; charge trapping; voltage 650.0 V; SiC-SiO<sub>2</sub>

**International Patent Classification:** B60L Electric equipment or propulsion of electrically-propelled vehicles; Magnetic suspension or levitation for vehicles; Electrodynamic brake systems for vehicles, in general; B60L1/00 Supplying electric power to auxiliary equipment of vehicles; B60M3/00 Feeding power to the supply lines in contact with collector on vehicles; Arrangements for consuming regenerative power; H01H Electric switches; Relays; Selectors; Emergency protective devices; H01L29/66 Types of semiconductor device; H02M Apparatus for conversion between ac and ac, between ac and dc, or between dc and dc, and for use with mains or similar power supply systems; Conversion of dc or ac input power into surge output power; Control or regulation thereof; H02M7/00 Conversion of ac power input into dc power output; Conversion of dc power input into ac power output; H01L29/772 Field-effect transistors

IPC code	Potential Patent Domain
B60L	Electric equipment or propulsion of electrically-propelled vehicles; Magnetic suspension or levitation for vehicles; Electrodynamic brake systems for vehicles, in general
B60L1/00	Supplying electric power to auxiliary equipment of vehicles
B60M3/00	Feeding power to the supply lines in contact with collector on vehicles; Arrangements for consuming regenerative power
H01H	Electric switches; Relays; Selectors; Emergency protective devices
H01L29/66	Types of semiconductor device
H02M	Apparatus for conversion between ac and ac, between ac and dc, or between dc and dc, and for use with mains or similar power supply systems; Conversion of dc or ac input power into surge output power; Control or regulation thereof
H02M7/00	Conversion of ac power input into dc power output; Conversion of dc power input into ac power output
H01L29/772	Field-effect transistors



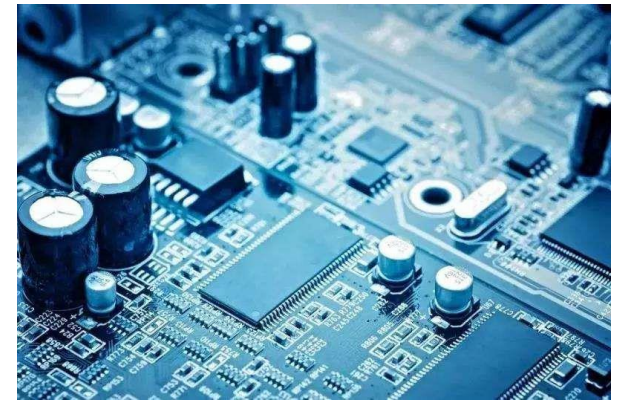
# 案例二-Engineering Village平台

## 课题描述

课题描述：单片微波集成电路功率放大器(MMIC power amplifiers) 在军用（雷达、电子战等）及民用（卫星通信、5G通信等）领域中应用广泛。国防和通信技术不断发展，使频谱资源稀缺，科研人员把目光转向Ka频段(26.5GHz-40GHz)，其具有以下优点：带宽宽；开发和使用较少；衰减较小；抗干扰能力强。同时，氮化镓(GaN)技术的发展实现了功率放大器不断提高的功率密度、更小的尺寸，出色的增益和效率，成为第三代半导体材料的代表。

❖ 根据课题描述，关键信息和参数如下：

- ✓ 单片微波集成电路功率放大器 (MMIC power amplifiers)
- ✓ 氮化镓 (GaN)
- ✓ Ka频段 (26.5GHz-40GHz)
- ✓ 功率 (Watt)
- ✓ 增益 (dB)
- ✓ 效率 (%)



# 分析逻辑

## ❖ INSPEC Analytics-研究领域概览

- 在Inspec Analytics中快速概览单片微波集成电路功率放大器“MMIC power amplifiers”的研究进展，包含文章数量、被引数据、研究机构、发文期刊和学术会议等信息。

## ❖ 检索策略

- 步骤1: 利用INSPEC数据库中独特的化学检索和数值检索，快速精准锁定文献范围。
  - A. 主题字段中选择MMIC功率放大器：MMIC power amplifiers
  - B. 化学检索：氮化镓（GaN）
  - C. 数值检索：频率（26.5GHz-40GHz）
  - D. 数值检索：功率、增益、效率（可根据课题需求，增减相关数值检索字段）



课程签到

小结：通过INSPEC数据库的“化学检索”（GaN/bin）和“数值检索”（频率范围：26.5-40GHz）的底层数据索引（INSPEC强大的叙词表），快速得到所检索主题的精准结果。一键实现从“大海捞针”到“精准锁定”。减小96%的检索“噪音”。Inspec模块需要单独勾选，以使用所有功能。

The screenshot shows the Engineering Village search interface. The search bar contains "MMIC power amplifiers". Below it, suggested terms include "III-V Semiconductors", "Gallium Arsenide", "Gallium Compounds", "Field Effect Mmic", and "Hemt Integrated Circuits". The search results show 2,781 records found in Inspec. The expert search query is: `((("MMIC power amplifiers") WN KY) AND ("GaN/bin") WN ALL) AND ((NU_FREQUENCY GTE 26.5 GHz) AND (NU_FREQUENCY LTE 40 GHz))`. The refined search results show 94 records found in Inspec for 1896-2022. The search is refined by category, with "Inspec" selected. The search results are sorted by Relevance. The first result is "10W Ka Band MMIC Power Amplifiers based on InAlGaN/GaN HEMT Technology" by Potier, C. et al. The second result is "First results on Ka band MMIC power amplifiers based on InAlGaN/GaN HEMT technology" by Potier, C. et al.

减少96%检索“噪音”

可根据需求，通过控制词及学科分类继续缩小检索范围，精确检索文献

### Controlled vocabulary

Filter results:

- |   |      |   |     |
|---|------|---|-----|
| <input type="checkbox"/> Mmic Power Amplifiers                    | (93) | <input type="checkbox"/> Low-Power Electronics          | (3) |
| <input type="checkbox"/> Iii-V Semiconductors                     | (88) | <input type="checkbox"/> Millimetre Wave Transistors    | (3) |
| <input type="checkbox"/> Gallium Compounds                        | (87) | <input type="checkbox"/> Power Dividers                 | (3) |
| <input type="checkbox"/> Wide Band Gap Semiconductors             | (87) | <input type="checkbox"/> Power Hemt                     | (3) |
| <input type="checkbox"/> Hemt Integrated Circuits                 | (33) | <input type="checkbox"/> S-Parameters                   | (3) |
| <input type="checkbox"/> Millimetre Wave Power Amplifiers         | (30) | <input type="checkbox"/> Broadband Networks             | (2) |
| <input type="checkbox"/> Aluminium Compounds                      | (29) | <input type="checkbox"/> Equivalent Circuits            | (2) |
| <input type="checkbox"/> Integrated Circuit Design                | (25) | <input type="checkbox"/> Integrated Circuit Manufacture | (2) |
| <input type="checkbox"/> High Electron Mobility Transistors       | (21) | <input type="checkbox"/> Microwave Amplifiers           | (2) |
| <input type="checkbox"/> Field Effect Mmic                        | (17) | <input type="checkbox"/> Microwave Switches             | (2) |
| <input type="checkbox"/> Silicon                                  | (15) | <input type="checkbox"/> Millimetre Wave Amplifiers     | (2) |
| <input type="checkbox"/> Field Effect Mimic                       | (12) | <input type="checkbox"/> Millimetre Wave Couplers       | (2) |
| <input type="checkbox"/> Silicon Compounds                        | (11) | <input type="checkbox"/> Millimetre Wave Radar          | (2) |
| <input type="checkbox"/> Elemental Semiconductors                 | (10) | <input type="checkbox"/> Mmic Phase Shifters            | (2) |
| <input type="checkbox"/> Power Combiners                          | (10) | <input type="checkbox"/> Network Topology               | (2) |
| <input type="checkbox"/> 5g Mobile Communication                  | (9)  | <input type="checkbox"/> Power Amplifiers               | (2) |
| <input type="checkbox"/> Wideband Amplifiers                      | (8)  | <input type="checkbox"/> Radio Transceivers             | (2) |
| <input type="checkbox"/> Mimic                                    | (7)  | <input type="checkbox"/> Satellite Communication        | (2) |
| <input type="checkbox"/> Millimetre Wave Field Effect Transistors | (6)  | <input type="checkbox"/> Semiconductor Device Breakdown | (2) |
| <input type="checkbox"/> Distributed Amplifiers                   | (5)  | <input type="checkbox"/> Thermal Management (Packaging) | (2) |
| <input type="checkbox"/> Gallium Nitride                          | (5)  | <input type="checkbox"/> Uhf Power Amplifiers           | (2) |

### Classification code

Filter results:

- |   |      |  |     |
|---|------|--|-----|
| <input type="checkbox"/> Amplifiers   | (92) | <input type="checkbox"/> Modulation and coding methods                 | (2) |
| <input type="checkbox"/> Microwave integrated circuits  | (90) | <input type="checkbox"/> Satellite communication systems               | (2) |
| <input type="checkbox"/> Other field effect integrated circuits                                 | (32) | <input type="checkbox"/> Reliability                                   | (1) |
| <input type="checkbox"/> Semiconductor integrated circuit design, layout, modelling and testing | (21) | <input type="checkbox"/> Combinatorial mathematics                     | (1) |
| <input type="checkbox"/> Other field effect devices   | (20) | <input type="checkbox"/> Interpolation and function approximation      | (1) |
| <input type="checkbox"/> Analogue circuit design, modelling and testing                         | (17) | <input type="checkbox"/> Network topology                              | (1) |
| <input type="checkbox"/> Waveguide and microwave transmission line components                   | (12) | <input type="checkbox"/> Digital circuit design, modelling and testing | (1) |
| <input type="checkbox"/> Solid-state microwave circuits and devices                             | (11) | <input type="checkbox"/> System-on-chip                                | (1) |
| <input type="checkbox"/> Mobile radio systems   | (9)  | <input type="checkbox"/> Inductors and transformers                    | (1) |
| <input type="checkbox"/> Waveguides and microwave transmission lines                            | (4)  | <input type="checkbox"/> Multichip modules                             | (1) |
| <input type="checkbox"/> Space vehicle electronics  | (4)  | <input type="checkbox"/> Dielectric breakdown and discharges           | (1) |
| <input type="checkbox"/> Product packaging  | (3)  | <input type="checkbox"/> Single antennas                               | (1) |
| <input type="checkbox"/> Power semiconductor devices  | (3)  | <input type="checkbox"/> Antenna arrays                                | (1) |
| <input type="checkbox"/> Radar equipment, systems and applications                              | (3)  | <input type="checkbox"/> Transmission line links and equipment         | (1) |
| <input type="checkbox"/> Filters and other networks   | (2)  | <input type="checkbox"/> Radio links and equipment                     | (1) |
| <input type="checkbox"/> Other analogue circuits  | (2)  | <input type="checkbox"/> Space communication systems                   | (1) |
|   |      | <input type="checkbox"/> Radar theory                                  | (1) |
|   |      | <input type="checkbox"/> Electronic warfare                            | (1) |

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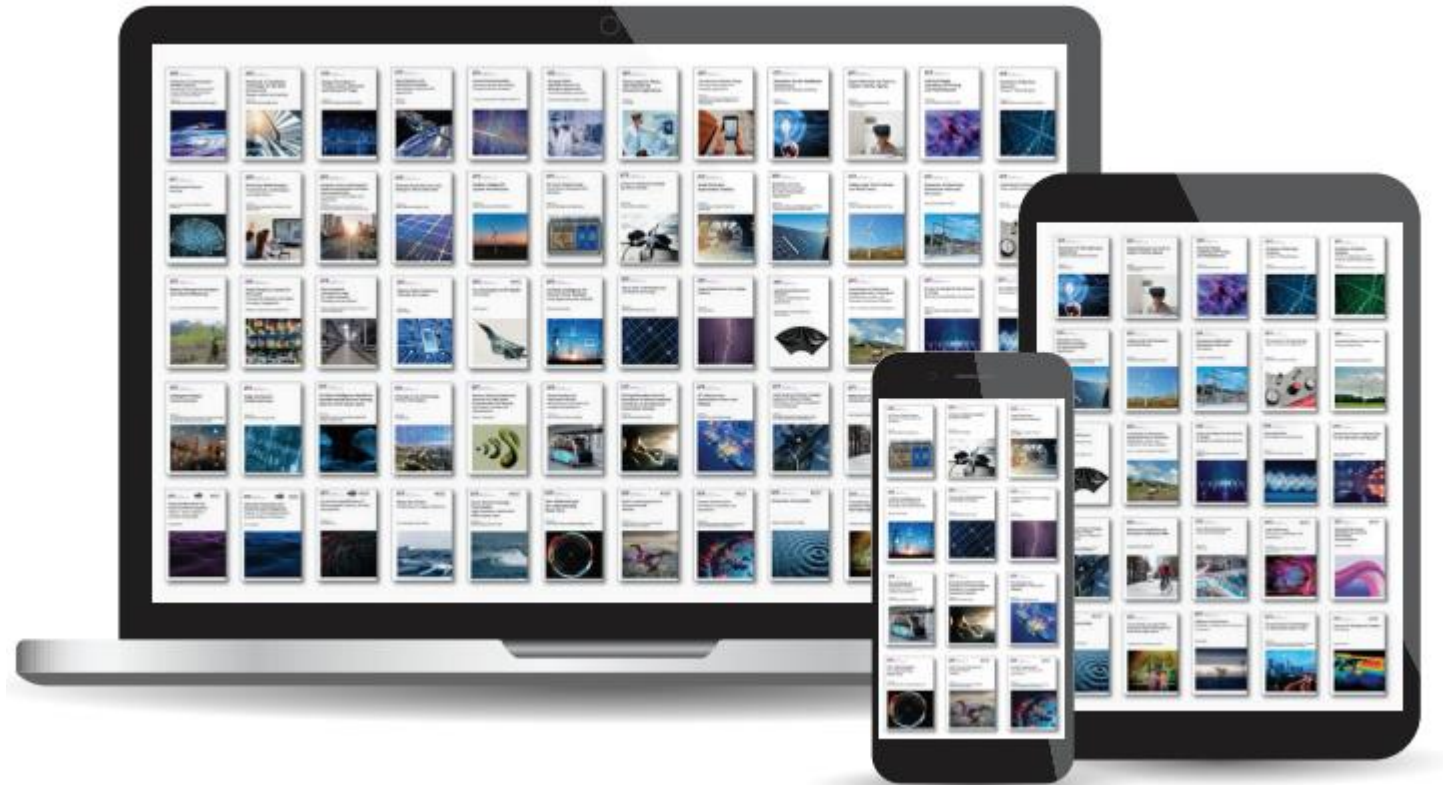
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能源工程	158	1968	12.46
电磁波	101	774	7.66
控制, 机器人和传感器	94	639	6.80
材料, 电路与器件	92	427	4.64
计算机与网络	40	287	7.18
电信技术	78	119	1.53
医疗技术	26	99	3.81
交通运输	21	42	2.00
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信息安全	12	24	2.00





非常感谢!