# Article information:

Ultra-broadband polarisation beam splitters and rotators based on 3D-printed waveguides  
<https://www.light-am.com/article/doi/10.37188/lam.2023.022>

# Article summary:

1. Polarisation manipulation is important in integrated optical systems, but traditional methods using discrete optical elements have limitations in terms of footprint and alignment.

2. 3D-printing based on multiphoton lithography offers a potential solution for fabricating polarisation beam splitters (PBSs) and rotators with high-aspect-ratio cross-sections.

3. The 3D-printed PBSs and rotators demonstrated in this study showed ultra-broadband performance and were successfully used in a dual-polarisation data transmission experiment, indicating their practical viability for integrated optics applications.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

这篇文章介绍了基于3D打印波导的超宽带偏振分束器和旋转器。文章指出，传统的光学系统中，偏振操作通常依赖于离散的光学元件，如偏振分束器或由双折射材料制成的波片。然而，在集成光子系统中使用离散的偏振操作元件存在一些限制，例如所需的占地面积和与芯片上光学电路的高精度对准需求。相反，可以将偏振操作功能集成到基于波导的平面光子电路中，利用模式选择性方向耦合器、多模干涉耦合器、偏振模式转换器、波导光栅等结构实现。然而，这些设备通常需要特殊的制造步骤，并受到传统二维微结构化通过层叠微影和干法刻蚀所限制。

作者提出了基于3D打印技术的新方法来解决这些问题。他们使用多光子光刻技术在单模光纤端面上直接打印了超宽带PBS、极化旋转器和模场适配器等结构，并展示了其在双极化数据传输实验中的实际应用。作者认为，3D打印的光学结构可以取代昂贵的离散微光学元件组装，从而为具有前所未有的紧凑性和可扩展性的光学系统铺平道路。

然而，这篇文章存在一些潜在的偏见和片面报道。首先，文章没有提及3D打印技术可能存在的局限性和风险。虽然作者提到了这些结构在波长范围内具有超过11 dB的极化消光比，并且在数据传输实验中没有引入可测量的光信噪比惩罚，但并没有详细讨论这些结构在更广泛的应用场景中可能遇到的问题。

其次，文章没有提供足够的证据来支持作者关于3D打印技术优势和替代传统制造方法的主张。尽管作者声称这种方法可以高效地制造大量设备，并且可以根据需要自由调整结构几何形状，但并没有提供实验证据来支持这些主张。

此外，文章也没有探索可能存在的反驳观点或其他对该技术进行批评或质疑的观点。它只呈现了作者对该技术的积极看法，并未平等地呈现双方的观点。

综上所述，这篇文章在介绍基于3D打印技术的超宽带偏振分束器和旋转器方面提供了一些有限的信息，并存在一些潜在的偏见和片面报道。更多的研究和实验证据需要进一步支持这种新技术的优势和应用前景。

# Topics for further research:

* 3D printing limitations and risks
* Potential problems in wider applications
* Lack of evidence supporting the advantages of 3D printing
* Lack of evidence supporting the claim of efficient manufacturing and adjustable structures
* Absence of opposing viewpoints or criticisms
* Need for further research and experimental evidence to support the technology's advantages and prospects.

# Report location:

<https://www.fullpicture.app/item/d6a653ff297a9a9aab77ee445dfadc06>