# Article information:

Direct visualization of phase-matched efficient second harmonic and broadband sum frequency generation in hybrid plasmonic nanostructures | Light: Science & Applications
<https://www.nature.com/articles/s41377-020-00414-4>

# Article summary:

1. The development of broadband and efficient optical frequency up-converters integrated with nanophotonics systems is highly desired for a range of applications.

2. Metallic nanostructures enable extremely small mode volumes through surface plasmon resonances, while the SHG/SFG conversion efficiency is hampered by the naturally small nonlinear coefficient of metals.

3. Hybrid plasmonic systems integrate a metal with nonlinear nanomaterials to effectively interplay between the subwavelength light confinement and large nonlinear susceptibility, enabling efficient SHG/SFG conversion in waveguides with a physical cross-sectional area of λ2/16.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article provides an overview of the development of broadband and efficient optical frequency up-converters integrated with nanophotonics systems, which are highly desired for a range of applications such as biosensing, imaging, photonic circuitry, etc. The article discusses how metallic nanostructures enable extremely small mode volumes through surface plasmon resonances but suffer from low SHG/SFG conversion efficiency due to their naturally small nonlinear coefficient. It then explains how hybrid plasmonic systems can be used to effectively interplay between the subwavelength light confinement and large nonlinear susceptibility, enabling efficient SHG/SFG conversion in waveguides with a physical cross-sectional area of λ2/16.

The article appears to be reliable and trustworthy overall as it provides detailed information on the topic at hand and cites relevant sources throughout its text. However, there are some potential biases that should be noted. For example, the article does not explore any counterarguments or present both sides equally when discussing the advantages of hybrid plasmonic structures for achieving highly efficient nonlinear conversion. Additionally, there is no mention of possible risks associated with this technology or any other potential drawbacks that should be considered before implementation. Furthermore, some claims made in the article are not supported by evidence or data which could weaken its credibility if not addressed properly.

All in all, this article provides an informative overview on hybrid plasmonic structures for achieving highly efficient nonlinear conversion but could benefit from further exploration into potential risks and counterarguments associated with this technology as well as providing more evidence to support its claims.

# Topics for further research:

* Risks associated with hybrid plasmonic structures
* Counterarguments for hybrid plasmonic structures
* Potential drawbacks of hybrid plasmonic structures
* Evidence for hybrid plasmonic structures
* Data for hybrid plasmonic structures
* Applications of hybrid plasmonic structures

# Report location:

<https://www.fullpicture.app/item/c093e7d431f634c7359184d88f8feb1f>