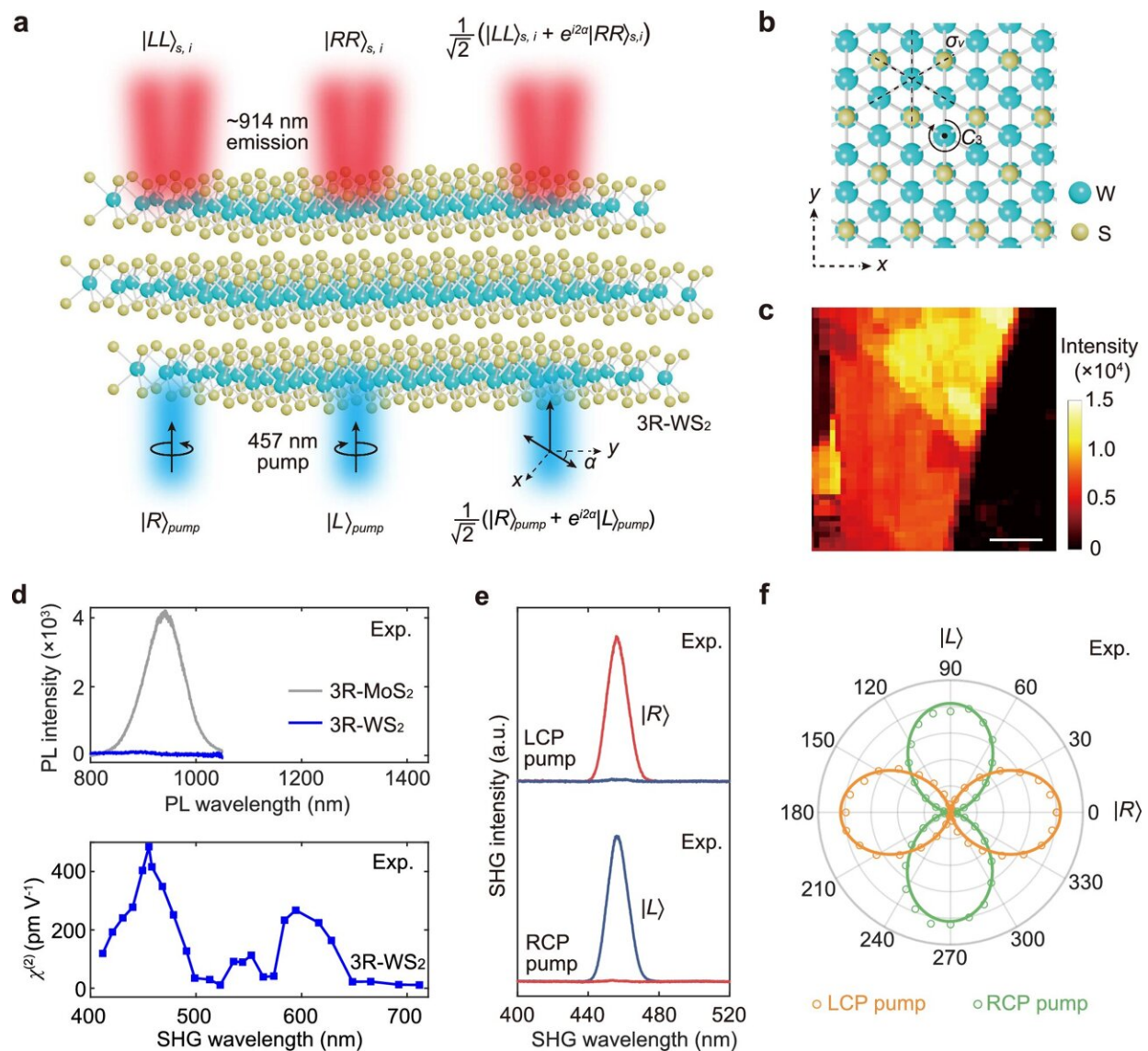


Scientists create ultracompact polarization-entangled photon sources for miniaturized quantum devices

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Generation of polarization-entangled photon pairs in 3R-WS₂. Credit: *eLight* (2024). DOI: 10.1186/s43593-024-00074-6

Scientists have created an ultra-thin light source that emits pairs of polarization-entangled photons. These specially correlated photons hold promise for future quantum technologies, including ultra-secure communication, powerful computation, and high-precision measurements. This light source is particularly small, pure, efficient, and versatile.

The research is [published](#) in the journal *eLight*.

Entangled photons share a unique connection. By measuring one photon's properties, scientists can instantly determine the properties of its entangled partner, regardless of distance. This [phenomenon](#) has the potential to revolutionize fields like communication, computation and metrology.

The new [light source](#) is made from a special material called 3R-WS₂ and is hundreds of times thinner than a [human hair](#). This material allows the light source to be miniaturized and integrated into future quantum photonic circuits.

The researchers achieved this breakthrough by carefully selecting a material with the right properties. The material needs to be able to efficiently generate entangled photons and have a well-defined internal structure. The researchers have identified the rule of material selection for polarization entanglement, facilitating the search for other potential quantum materials with superior performance.

This research represents a step forward in developing practical quantum

technologies. By creating smaller, more efficient sources of entangled [photons](#), scientists are bringing quantum technology closer to reality.

More information: Jiangang Feng et al, Polarization-entangled photon-pair source with van der Waals 3R-WS2 crystal, *eLight* (2024). [DOI: 10.1186/s43593-024-00074-6](#)

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