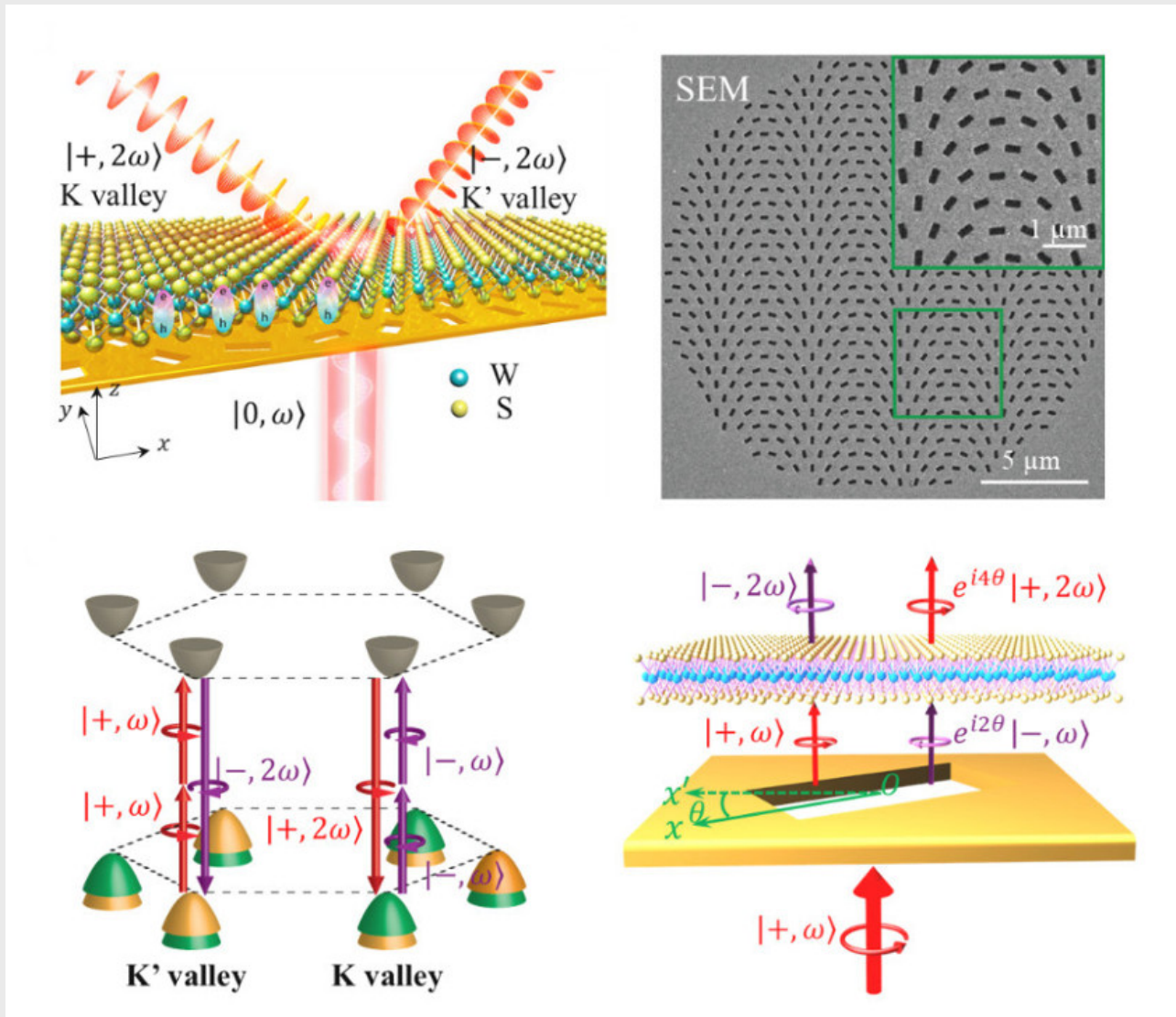


## Steering of Chiral Valley Photons in Transition Metal Dichalcogenides



Article: published in [Nature Photonics](#) by [Francisco J. Garcia-Vidal](#), IFIMAC researcher and member of the Department of Theoretical Condensed Matter Physics.

Two-dimensional transition metal dichalcogenides (TMDCs) present extraordinary nonlinearities and direct bandgaps at the K and K' valleys. These valleys can be optically manipulated through, for example, plasmon-valley-exciton coupling with spin dependent photoluminescence. However, the weak coherence between the pumping and emission makes exploring nonlinear valleytronic devices based on TMDCs challenging. In a collaboration between IFIMAC member [Francisco J. Garcia-Vidal](#) and two experimental groups based in Singapore and China, it has been demonstrated that a metasurface (a gold film drilled with rectangular nanoholes arranged in a hexagonal lattice but with different local rotation angles), which entangles the phase and spin of light, can simultaneously enhance and manipulate nonlinear valley-locked chiral emission in monolayer tungsten disulfide at room temperature. The second-harmonic valley photons, accessed and coherently pumped by light, acquire a spin related geometric phase provided by the gold metasurface and are separated and routed to predetermined directions in free space. In addition, the nonlinear photons with the

same spin as the incident light are steered owing to the critical spin-valley locked nonlinear selection rule of monolayer tungsten disulfide in the designed metasurface. This work opens a new avenue to utilize plasmonic metalsurfaces in order to build-up advanced room-temperature and free-space nonlinear, quantum and valleytronic nanodevices. [[Full article](#)]

## The Inclusion of the Gender Perspective in Scientific Research

**Inclusión de la perspectiva de género en la investigación científica**  
Curso teórico-practico dirigido a estudiantes de master y doctorado

**Programa**  
10h00-11h00 "Género y programas europeos" **Cristina Sánchez**  
11h00-11h30 Debate  
11h30-12h00 Café  
12h00-13h00 "Género e investigación", **Yolanda Guerrero**  
13h00-13h50 Debate  
13h30-14h00 Conclusiones

**Viernes 5 de Abril, 10:00-14:00**  
**Sala de seminarios, Módulo 3, 5ª planta**  
**Facultad de Ciencias**  
**UAM**

**IFiMaC** **iUEM** Instituto Universitario de Estudios de la MUJER

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Friday the 5<sup>th</sup> of April 2019, it has been organised a course about the inclusion of the gender perspective in scientific research. The course is primarily directed to Master and PhD students in Physics, as well as Post-Docs. The theoretical/practical course will be delivered by Prof. Yolanda Guerrero, professor of medieval history at the UAM and Prof. Cristina Sánchez, professor in philosophy of law at UAM. Both professors have been in charge of the UAM "[Instituto Universitario de Estudios de la Mujer](#)" and have already successfully taught this course in within other doctoral programs in science and, in particular, in Physics.

The course will last three hours with a coffee break in between. We ask you to confirm assistance by sending an email to Manuela Moreno at [manuela.moreno@uam.es](mailto:manuela.moreno@uam.es) no later than Wednesday April the 3<sup>rd</sup>, in order to organize the coffee break. You can find more information in the attached program.

This course is organized within the framework of the [Master in Physics of Condensed Matter and Biological Systems](#).

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