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Sesión Científica: Fisica Solar

Titulo: Small-scale magnetic flux emergence in the quiet Sun: 3D radiation-magnetohydrodynamics modelling.

Nombre (Autor que presenta): Fernando

Apellidos (Autor que presenta): Moreno Insertis

Apellidos y nombre de los autores: Moreno Insertis, F.; Martinez Sykora, J.; Hansteen, V.

Resumen:

Understanding the physics behind the emergence of magnetic flux on the smallest observed scales in the quiet Sun requires the use of radiation-magnetohydrodynamics modeling tools. In the past ten years, observational evidence has been obtained that magnetic flux reaches the surface also in what appear to be individual flux tubes or arches rising within granular cells, hence on sub-arcsecond scales: in that achievement the Spanish solar physics community has played an important role. This phenomenon clearly involves at least the uppermost layers of the solar interior, the photosphere, the chromosphere, and possibly also the low corona. Using the Bifrost code, we have created a realistic 3D magnetoconvection model adequate to the quiet Sun spanning from the top of the convection zone to the corona. We let magnetic flux emerge through the convection cells following its injection through the bottom of the box. We study the mode of appearance of the magnetic flux at the surface and diff erent features of the emerging magnetic structures, including their subsurface origin and their interaction with the atmospheric layers at different levels. Comparison with observational results is also attempted to a limited extent using a-posteriori spectral synthesis of the numerical 3D snapshots for a few relevant spectral lines.