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Pulsar glitches: a window on neutron star interior

Nuclear superfluidity is thought to play a key role in the dynamics of isolated neutron stars. In particular, pulsar glitches offer a glimpse into the superfluid interior of a neutron star: within the currently accepted scenario these timing irregularities are explained in terms of the motion of quantized vortex lines that permeate the superfluid region.

To store the angular momentum which can be eventually released during a glitch, some sort of “pinning mechanism” that blocks the vortex lines is invoked. Hence, understanding the collective dynamics of superfluid vortex lines in complex environments (like the stellar crust) is an essential ingredient that is required if we want to take our understanding of glitches to the next level.

Primary author(s) : Dr ANTONELLI, Marco (Nicolaus Copernicus Astronomical Centre of the Polish Academy of Sciences)

Co-author(s) : Dr HASKELL, Brynmor (CAMK - Warsaw); Prof. PIZZOCHERO, pierre (university of milano)

Presenter(s) : Dr ANTONELLI, Marco (Nicolaus Copernicus Astronomical Centre of the Polish Academy of Sciences)