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The role of magnetic field in pulsar glitches

Spin-up or 'glitch' events in neutron stars are believed to be driven by an internal neutron superfluid component that is only weakly coupled to the rest of the star. Recent calculations have shown that the inner crust superfluid is not enough to explain the largest glitches, suggesting that interactions between superfluid components in the core are also involved. Rotational vortices and magnetic fluxtubes impede each other's motion until some critical threshold is reached, at which the vortices are released and angular momentum is transferred to the crust in a glitch. We present preliminary work to study this process quantitatively, which requires modelling of both the macroscopic fluxtube and vortex geometries (which are typically not symmetric about the same axis) and also the microscopic interaction between them.

Primary author(s) : Dr ANTONOPOULOU, Danai (Post-doc)

Co-author(s) : Dr LANDER, Samuel (N. Copernicus Astronomical Centre)

Presenter(s) : Dr ANTONOPOULOU, Danai (Post-doc)