



Laboratoire LEPRINCE-RINGUET
Ecole polytechnique IN2P3/CNRS

Séminaire

Magnetic cycles of the Sun and solar-type stars

The Sun sustains its large-scale magnetic field thanks to its internal turbulent motions through a so-called dynamo effect. Global simulations of the convective dynamo of the Sun and solar-type stars have exhibited in the past decade a rich variety of magnetic self-organization, from small-scale turbulent fields; stable magnetic structures; to periodically reversing large-scale magnetic fields. In the cyclic cases, though, the physical ingredients setting the cycle period still eluded our understanding

After introducing observational constraints on stellar magnetism, I will first give a brief tour of the present status of non-linear dynamo simulations in deep stellar convection zones, with a particular focus on results obtained using implicit large eddy simulations (ILES) for solar-like, cyclic, turbulent dynamos. I will then present a series of 3D global simulations performed with the EULAG code where the period of the simulated magnetic cycle systematically varies with the rotation rate and luminosity of the modelled star. The dynamo acting in these simulations is fundamentally non-linear, where the Lorentz force feedback on the mean flows plays a major role in the dynamo loop. These results shed a new light on non-linear dynamo processes possibly acting inside solar-like stars.

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Salle conférence du
LLR

**Lundi 25
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14h00**

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Responsables séminaires

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