

## Theory Lunch Seminar

# *Theory and simulation of the plasma dynamics at the edge of fusion device*

In the edge region of a fusion device the temperature decreases, over only a few centimetres, from a value ten times higher than in the centre of the Sun, to the room temperature of the surrounding solid walls. This extreme gradient, probably the steepest in the Universe, drives highly complex physics phenomena, including strong turbulence, within the plasma fusion fuel. Turbulence is more complex in plasmas than other fluids due to the interaction of the charged plasma particles with the electromagnetic fields. At the edge of a fusion device, turbulence can involve powerful nonlinear phenomena on spatial and temporal scales spanning ten orders of magnitude. Turbulence is, moreover, extremely anisotropic and include the interaction of large-scale fluid and microscopic kinetic phenomena, atomic physics processes, and complex geometry. The goal of this talk is to shine some light on the pertinent physics at the edge of a fusion device and explain the physics models that we developed for its description, the simulation capabilities we established, and our advances in the theoretical understanding of edge turbulence.



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**Thursday March 8<sup>th</sup> 2018 at 12:30 pm**

**Auditoire III, room N°233, BSP (Cubotron), EPFL**