

Contribution ID: 22

Type: **not specified**

Linear stability of accretion disks under the influence of stratification and thermal relaxation

Wednesday 6 August 2014 14:00 (30 minutes)

Keplerian disks have proven to be extremely stable to perturbations, when magnetic fields are not in operation. But disks around young stars are complicated entities - they share a lot of properties with planetary atmospheres and one can learn a lot from the stability of rotating stars. Disks around young stars have a radial temperature gradient driven by stellar irradiation, which leads to a thermal wind, e.g. vertical shear. In addition the temperature gradient leads to a height dependent radial stratification that can be radially buoyant. Without thermal relaxation these disks are linearly stable, but with the right amount of cooling and heating for instance by the radiative transport of heat, one can drive a Goldreich-Schubert-Fricke Instability (see for instance Nelson et al 2013) and a Convective Overstability (Klahr and Hubbard 2014; Lyra 2014). In this talk I discuss some recent results from linear stability analysis and numerical experiments.

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Session Classification: Wednesday Afternoon

Track Classification: Workshop Main Programme