Title : The role of strongly magnetized disks in the spectral hysteresis of X-ray binaries

Abstract : Since the finding that the magneto-rotational instability can drive turbulence in accretion disks, the role of magnetic fields has been confined to producing an effective turbulent viscosity in standard accretion disk models. However, in the past ten years simulations have shown that the properties of strongly magnetized disks largely deviate from standard models. The magnetic field can launch powerful outflows, support the disk vertically, produce accretion through vertically elevated layers or non-axisymmetric structures and even accelerate particles to very high energies. All of these effects dramatically affect the observational signature of accretion disks. In this talk, I will show a comprehensive analysis of a set of global GRMHD simulations showing how the properties of strongly magnetized accretion disks vary when going from thick, hot disks to cold, thin disks. I will show in particular that in thin, luminous disks the magnetic field is able to maintain the vertical density structure to larger heights than the thermal scale height and drive accretion at much faster inflow speed than the standard theory would predict. Based on these results, I will show how magnetic fields can affect the thermal and radiative evolution of luminous accretion disks and drive a natural hysteresis in X-ray binaries.