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Modeling of Wind -fed accretion in HMXBs using GRMHD code

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Accretion disks in High mass X-ray binaries (HMXB's) are mostly fed by the stellar wind from their companion star. These winds also affect the observed X-ray spectra arising from the hot coronal flow.
Cygnus X-1 and its companion star, HDE-226868 is one of such HMXBs. It is one of the brightest X-ray sources observed and shows the X-ray intensity variations in both the soft and hard X-rays. I will present my recent work on 2D numerical modeling using GRMHD code - HARM, replicating such focused, clumpy wind from the binary companion fed for accretion onto the black hole. We model an inviscid, non-magnetized, transonic accretion flow with a low angular momentum profile. I will talk about how we model transonic accretion and my prescribed time-dependent boundary conditions in this code. I will further discuss how it affects the hydrodynamics of the flow in the relativistic framework and what information it reflects on the Power Density Spectra (PDS)

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