Title:	Accretion onto Strongly-Magnetized Misaligned Neutron Stars
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Abstract:	Compact objects, namely white dwarfs, neutron stars and black holes are the end-points of stellar evolution, formed from the collapse of massive stars. The process by which massive objects accumulate matter due to their self-gravity is known as accretion. When part of a binary system, compact objects can accrete matter onto their surface through an accretion disk. In the case of neutron stars, their extremely strong magnetic fields cause the accretion disk to be disrupted at a particular radius, beyond which matter is forced to channel along the magnetic field lines. In such a scenario, the matter is accreted to the poles of the neutron star. A self-consistent study of the accretion process from the disk to the neutron star surface is pivotal in improving our understanding of accreting pulsars. This work aims to study the process of accretion onto misaligned neutron stars, that is, neutron stars which have a misalignment between their magnetic and rotation axes. The accreted matter when subjected to strong magnetic fields and densities close to the neutron star, emits radiation through different emission processes. This emission, which is largely concentrated near the poles, results in periodic pulsations to be observed in the case of misaligned neutron stars. Such objects are known as pulsars and a large number of such objects have been detected. Therefore, study of the accretion funnel region and the emission mechanisms involved in the same are important, as it aids in a better understanding of accreting pulsars and a better correlation with observations. In this work, we explore the properties of the accretion funnel region in misaligned neutron stars using ideal magnetohydrodynamics, for a strongly magnetized neutron star with dipolar magnetic field. We employ a variable adiabatic index Equation of State to account for the large variation of temperature in the accretion flow. Different emission processes like bremsstrahlung, cyclosynchrotron and their inverse-Comptonised components are included in our analysis to obtain self-consistent global accretion solutions. The effect of misalignment angle on funnel-flow accretion and the importance of including cyclosynchrotron emission are discussed in this work.
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