SPIN EVOLUTION OF PULSARS CHALLENGES STANDARD ACCRETION SCENARIOS

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Quasi-spherical and Keplerian disk accretion scenarios encounter major difficulties explaining the origin and observed spin evolution of long-period X-ray pulsars. We show that these difficulties reflect an oversimplification of the scenarios in which the magnetic field of the accretion flow is neglected. We find that the picture of accretion onto a neutron star which captures material from a magnetized wind differs from those previously suggested. It can be explained in terms of a dense non-Keplerian magnetic slab in which the material is confined by its intrinsic magnetic field. This scenario (a so called Magneto-Levitation Accretion, MLA) has been initially developed by G.S. Bisnovatyi-Kogan and A.A. Ruzmaikin for the case of a black hole. We find that a neutron star accreting material from the magnetic slab brakes harder and its magnetospheric radius is significantly smaller than that evaluated in the traditional non-magnetic accretion flow scenarios. We show that the mass-transfer towards the neutron star in MLA scenario is governed by anomalous diffusion and the expected appearance of the MLA pulsar is in a good agreement with observations.