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Polarized radiation from rapidly rotating oblate neutron stars

We compute the polarization of radiation from two hot spots at surface of an oblate neutron star. We account for rotation of the polarization plane due to relativistic effects along the path from the star surface to the observer. We show that the obtained polarization angle (PA) may differ substantially from the corresponding values derived for a spherical star. We also study, with a toy model, how accurately the geometrical parameters of an accreting neutron star could be determined using the X-ray polarization measurements of upcoming polarimeters. The results imply that the observer and spot inclination angles can be constrained within a few degrees, if the PA is measured with accuracy of 2 degrees that is achievable with the upcoming Imaging X-ray Polarimeter Explorer or enhanced X-ray Timing and Polarimetry mission.

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