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IXPE Observations of the Pulsar 4U 1626-67

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We report on new X-ray spectropolarimetric observations from the recently launched Imaging X-ray Polarimetry Explorer (IXPE) of the ultracompact low-mass X-ray binary system 4U 1626-67. We also report on supplementary observations taken by NICER and Chandra/HETGS around the IXPE observation window. We will present time-resolved spectropolarimetric 2-8 keV IXPE observations of 4U 1626-67 and discuss implications for our understanding of accretion geometries in accreting pulsars; we will also present results from intensity-resolved spectropolarimetric analysis. 4U 1626-67 is an interesting system as it hosts a slowly spinning accretion-powered pulsar (~ 7.7 s) with a strong magnetic field ($B \sim 10^{12}$ G) in a ~ 42 minute ultracompact orbit around a very low mass hydrogen-depleted companion. It has exhibited two episodes of long-term torque reversals in 1990 and 2008, and it is currently in the spin-up state. The quiescent emission in the spin-up state is also occasionally punctured by >100 s-long flaring episodes, which we will discuss in context of the new polarization measurements. The pulse profiles also exhibit strong energy dependence, and the system hosts a highly collisionally-ionized plasma in the accretion disk and complex emission line phenomena around 1 keV (attributed to Ne X and O VIII).

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