

## Measuring the magnetic dipole moment and magnetospheric fluctuations of SXP 18.3 with a Kalman filter

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X-ray flux and pulse period fluctuations of accretion-powered pulsars in the Small Magellanic Cloud and elsewhere convey important information about the disk-magnetosphere interaction. In this talk, we present a novel signal processing framework based on the canonical magnetocentrifugal accretion torque and a linear Kalman filter to generate time-dependent estimates of the state variables associated with magnetocentrifugal accretion, namely the mass accretion rate, the Maxwell stress at the disk-magnetosphere boundary, and the radiative efficiency of the accretion. The parameter estimation scheme maximizes the Kalman filter likelihood to infer the underlying static physical parameters, including the magnetic dipole moment  $\mu$ . We present new results for the Small Magellanic Cloud X-ray transient SXP 18.3 and discuss implications of the parameter estimation platform for (i) a population-wide analysis of magnetic dipole moments  $\mu$  in the Small Magellanic Cloud; and (ii) searches for continuous gravitational radiation from low-mass X-ray binaries.

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