



Rotating Stars and Revolving Planets: Bayesian Exploration of the Pulsating Sky

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I describe ongoing work on development of Bayesian methods for exploring periodically varying phenomena in astronomy, addressing two classes of sources: pulsars, and extrasolar planets (exoplanets). For pulsars, the methods aim to detect and measure periodically varying signals in data consisting of photon arrival times, modeled as non-homogeneous Poisson point processes. For exoplanets, the methods address detection and estimation of planetary orbits using observations of the reflex motion "wobble" of a host star, including adaptive scheduling of observations to optimize inferences.

Comments: 28 pages, 6 figures. Invited discussion paper for the Ninth Valencia International Conference on Bayesian Statistics (discussant was Peter Mueller); to appear in "Bayesian Statistics 9," ed. by Jos'e M. Bernardo et al., Oxford University Press (2011); see [this http URL](#)

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