Contribution ID: **139** Type: **Contributed Talk**

Statistical Goodness and Utility: Lessons learned from multiband pulsar light curve fits

Tuesday 11 October 2022 16:45 (15 minutes)

Joint multiband model fits to observed pulsar light curves (LCs) hold the potential to yield tight constraints on a variety of pulsar parameters (e.g., the magnetic inclination α; compared to single-band fits) for a variety of pulsars. This potential is arguably yet unrealised in many cases, though, typically due to a substantial imbalance across wavebands in the observed LCs' precision. For example, constraints derived via joint fits to observed radio and γ-ray LCs are often radio-dominated, and indistinguishable from those derived via radio-only fits. As yet, no definitive solution to this problem has been found.

In this talk we discuss the core lessons we learned while investigating the multiband fitting problem. Most prominent among these is that what lies at the centre of this problem is a general misunderstanding of the role played by the various likelihood-related statistics we use to conduct multiband fits (e.g., Pearson's χ^2 statistic, often used to gauge goodness-of-fit); these statistics are used as proxies for appropriate utility functions/statistics. As we aim to demonstrate in this talk, however, this insight is no condemnation of likelihood-related statistics. We argue that such statistics generally complement other utility statistics, and aim to demonstrate this via a case study of the joint fits to the radio and γ-ray LCs observed for PSR J2039−5617, reported in Corongiu et al. (2020) and conducted using the $\Psi^2_{\Phi,c}$ statistic to gauge utility.

Track

Pulsars

Author: SEYFFERT, Albertus

Co-authors: HARDING, Alice (Los Alamos National Laboratory); VENTER, Christo

Presenter: SEYFFERT, Albertus

Session Classification: Parallel 6