The Structure and Signals of Neutron Stars, from Birth to Death



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Follow-up searches for continuous gravitational waves

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Isolated neutron stars are possible sources of continuous gravitational waves. If the source parameters are known, a putative signal can be searched at negligible computing cost. For unknown source parameters, the weakness of the expected signal combined with the large parameter space to search yields an unfeasible computing cost for fully coherent search techniques. Therefore advanced semi-coherent search methods have been developed, e.g., StackSlide and the Hough transform. These methods are currently used in distributed computing environments such as Einstein@Home. The searches narrow down the parameter space around possible candidates, which then need to be followed up. We present a general two-stage method based on numerical optimization (NOMAD), which allows for the fully coherent follow-up of such candidates on all of the available data at a feasible computing cost. We describe the practical application of this procedure on the candidates from a semi-coherent Hough-transform all-sky search.

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