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Enhancing binary neutron stars studies by combining inspiral and postmerger information

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Recent discoveries of binary black holes by gravitational-wave detection hint at the opportunity of observing binaries containing neutron stars. Unlike with black holes alone, the presence of a neutron star can help us constrain the equation of state of ultradense matter. The feasibility of constraining the equation of state through gravitational-wave detections have typically been studied using the inspiral and post-merger stages separately. We quantify the benefits of combining the inspiral and the postmerger stages when analysing binary neutron star signals. Moreover, we show that one can probe whether the merged object remains in a hyper-massive neutron star phase or whether it promptly collapses into a black hole.

Auteur principal: Prof. LI, Tjonnie (The Chinese University of Hong Kong)

Co-auteurs: M. PANG, Peter Tsun Ho (The Chinese University of Hong Kong); Dr BERNUZZI, Sebastiano (University of Parma)

Orateur: Prof. LI, Tjonnie (The Chinese University of Hong Kong)

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