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Kilonova signals in NS-BH mergers

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A kilonova signal is generally expected after a Black Hole - Neutron Star merger. The strength of the signal is related to the Equation of State of neutron star matter and it increases with the stiffness of the latter. The recent results obtained by NICER suggest a rather stiff Equation of State and the expected kilonova signal is therefore strong, at least if the mass of the Black Hole does not exceed $\sim 10 M_{\odot}$. We compare the predictions obtained by considering Equations of State of neutron star matter satisfying the most recent observations with the results predicted in the two-families scenario. In the latter a soft hadronic Equation of State produces very compact stellar objects while a rather stiff quark matter Equation of State produces massive strange quark stars, satisfying NICER results. The expected kilonova signal in the two-families scenario is very weak: the Strange Quark Star - Black Hole merger does not produce a kilonova signal because, according to simulations, the amount of mass ejected is negligible and the Hadronic Star - Black Hole merger produces a signal much weaker than in the one-family case because the hadronic Equation of State is very soft. This prediction will be easily tested with the new generation of detectors.

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