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Thermal behavior of hyperons in binary neutron star merger remnants

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The coalescence of a binary system of neutron stars represents a natural laboratory to study hot and ultra-dense matter. Under these extreme conditions, exotic species like hyperons may be present. In this work, we present a comprehensive study of hyperons in neutron star mergers, focusing on the thermal impact they have on the Equation of State. The presence of the hyperons in a hot dense matter produces a significant drop of the thermal pressure. This effect consequently leaves a trace in the observables that can be measured. In particular, we identify that hyperonic equations of state produce a characteristic increase of the dominant postmerger gravitational-wave frequency by up to ~ 150 Hz compared to purely nucleonic EoS models. Our findings provide an important analysis tool to finally give an answer to the longstanding question: are hyperons present in ultra dense matter?

Primary author: KOCHANKOVSKI, Hristijan (Departament de Fisica Quantica i Astrofisica and Institut de Ciencies del Cosmos, Universitat de Barcelona, Marti i Franques 1, 08028, Barcelona, Spain)

Presenter: KOCHANKOVSKI, Hristijan (Departament de Fisica Quantica i Astrofisica and Institut de Ciencies del Cosmos, Universitat de Barcelona, Marti i Franques 1, 08028, Barcelona, Spain)

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