physikalisches Kolloquium

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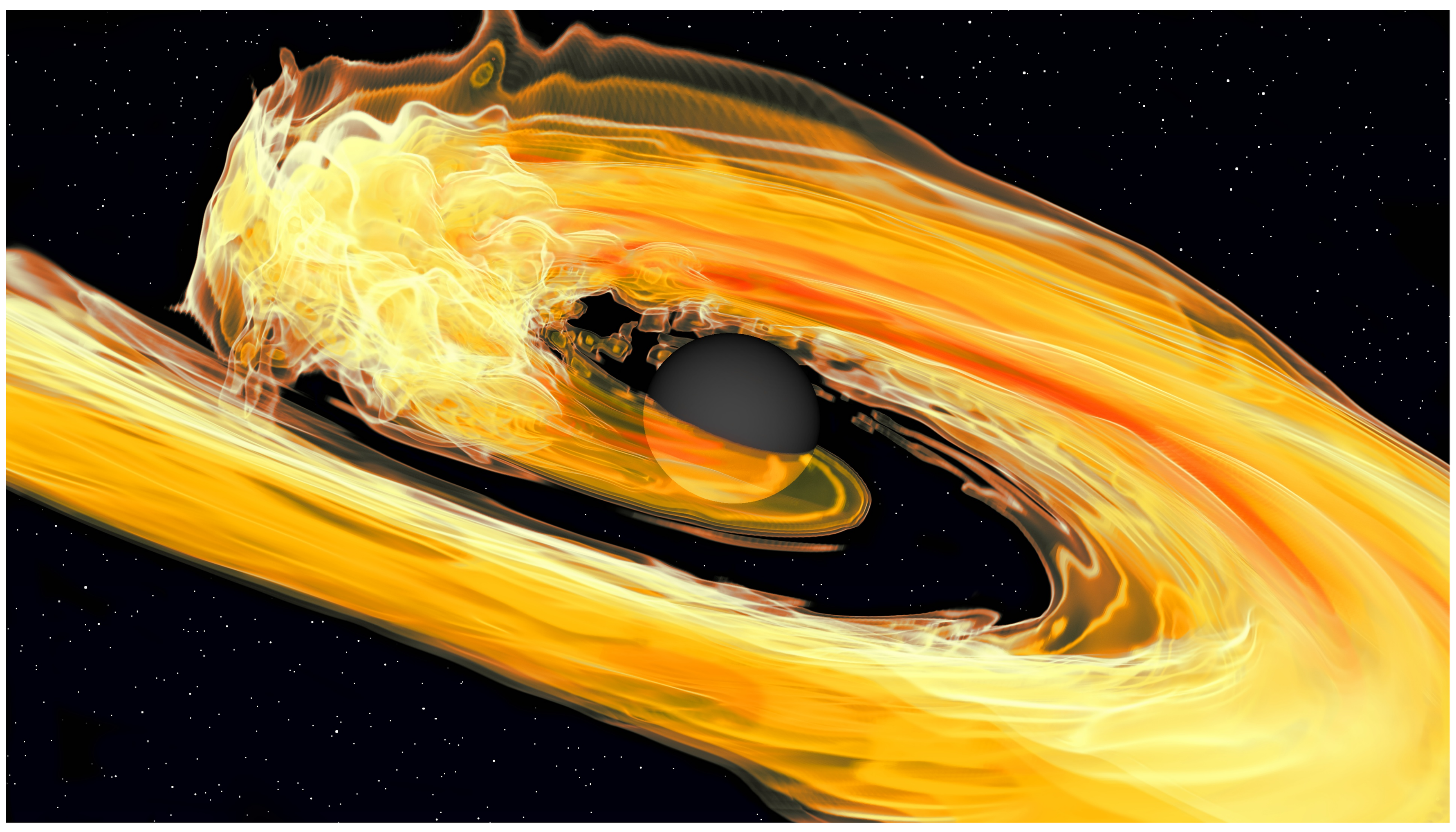
Revealing Cosmic Mysteries with the Help of Compact Binary Mergers

Mo. 29.1.24
16:00 Uhr
Ort: H34

Neutron stars are among the most compact objects in the Universe, and the collision of two neutron stars is among the most energetic events in our Universe.

In 2017, the multi-messenger detection of gravitational waves and electromagnetic signals from such a collision has been a revolution in astronomy and provided a wealth of information about fundamental physics principles. Essential for an accurate interpretation of binary neutron star mergers are reliable models describing the last stages of their coalescence.

We show how numerical-relativity simulation can be used to derive such theoretical models for the gravitational-wave and electromagnetic signatures. We employ these models together with nuclear-physics computations and experimental data to measure the equation of state of neutron stars, understand heavy element production, and provide new constraints on the Hubble constant.



Simulation of a neutron star - black hole coalescence in which the neutron star is tidally disrupted during the merging process. [Credit: T. Dietrich, N. Fischer, S. Ossokine, H. Pfeiffer, S.V.Chaurasia, T. Vu]

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