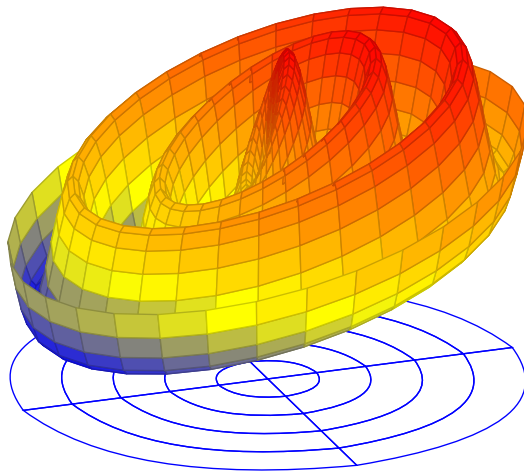


Friday, 24 January 2025 at 14:15

Urania Berlin, Old Wing (Altbau), 3rd floor, An der Urania 17

Tea & Cookies starting at 13:00



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Carla Cederbaum

(U Tübingen)

Coordinates are messy in general (relativity)

In differential geometry, one expresses geometric concepts such as curvature in an abstract language, that is, without reference to any (local) coordinates. Einstein's general theory of relativity (GR) is exploiting this abstract language to study the nature of space and time and its interaction with gravitation. Yet, to define and study "isolated" "relativistic systems" such as stars, black holes, or galaxies, our field has resorted to re-introducing coordinates "asymptotically". While this re-introduction of coordinates into GR allows us to do computations and to derive mathematical notions and formulas for important physical concepts such as the total mass of an isolated system, it has also introduced quite some "mess": the closer one looks, the more one finds that the mathematical notions and formulas for physical concepts show undesired and/or unforeseen dependence on the choice of coordinates.

This talk is based on joint work with Christopher Nerz, with Anna Sakovich, and with Melanie Graf and Jan Metzger. No familiarity with differential geometry or GR is assumed.

Carla Cederbaum has been a professor for differential geometry and mathematical relativity at the University of Tübingen since 2016. After her undergraduate education in mathematics and physics in Freiburg and Cambridge (UK), she obtained her PhD from Freie Universität Berlin in 2011 as a BMS student. She then held postdoctoral positions at Duke University (US) and in Tübingen. She has received the Manfred Fuchs Award of the Heidelberg Academy of Sciences and Humanities as well as several awards for her science communication and teaching activities.

