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国台学术报告 NAOC COLLOQUIUM

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Time: Wed. 2:30 PM, May 18 **Location: A135, NAOC**

Gravitational wave astrophysics: Theory, simulation and observation

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Rainer Spurzem is a Senior International Scientists at NAOC. He has completed his Ph.D. at the University of Göttingen (Germany) in 1988 with a thesis on stellar systems around supermassive black holes. During the 90s he worked as a researcher and teaching assistant at the University of Kiel (Germany), bringing GRAPE special purpose computers for astrophysical N-body simulations to Europe. After postdocs and visiting fellowships in the UK, Japan and the U.S. he moved to the University of Heidelberg in 1996, where he obtained an honorary professorship in 2003. He was awarded with the GRACE project grant funded by Volkswagen foundation in Germany, which designed the GRACE supercomputer. Since 2009 he is leading the Silk Road Project at NAOC in Beijing, as a research professor, working on computational astrophysics, stellar dynamics and high-performance computing.

Abstract

I will present an overview of black holes of different origins and masses in the universe and their role as sources of gravitational waves, across the entire wavelength range of future gravitational wave astrophysics. After some general introduction the work of the Silk Road Project team to model the dynamical evolution of these sources and their detailed gravitational wave emission will be described - this topic ranges from the dynamics of supermassive black holes in galactic nuclei to globular cluster evolution (with stellar mass black holes). Our method to follow the Post-Newtonian' dynamics and gravitational wave emission from black hole binaries in our model simulations will be shown. We detect objects very similar to GW150914 in our data and show their emitted gravitational waveforms match the observed one; in addition to that we know the detailed dynamical history of the object. And we think there should be more detections soon according to our models. If time allows, the necessary high performance supercomputing software and hardware needed to do our simulations, current and future, will be discussed.

All are welcome! Tea, coffee, biscuits will be served at 2:15 PM.