Student positions in relativistic astrophysics

The gravity and high energy astrophysics group led by Cosimo Bambi is looking for new students interested in projects on tests of general relativity, black holes, and alternative theories of gravity. We are currently working on the following topics:

1) **Testing the Kerr-nature of astrophysical black hole candidates**. This is the main line of research of our group. Today we know a number of stellar-mass black hole candidates in X-ray binary systems and super-massive black hole candidates in galactic nuclei. All these objects are thought to be the Kerr black holes predicted in Einstein's theory of gravity, but there is yet no evidence that the spacetime geometry around them is really described by the Kerr solution. In our group, we use numerical codes to predict the properties of the electromagnetic radiation emitted by the accreting gas in Kerr and non-Kerr spacetimes to constrain possible deviations from the Kerr geometry with present and future observations.

2) **Alternative theories of gravity**. We study black holes, wormholes, and collapsing objects in alternative theories of gravity to figure out potential macroscopic deviations from the prediction of Einstein's theory of gravity.

3) **X-ray astronomy** (in collaboration with Lijun Gou at NAOC). We are interested in X-ray data analysis of stellar-mass black hole candidates. The main goals are to measure the properties of these objects and figure out the actual mechanism responsible for the formation of powerful jets.

4) **Gravitational waves** (in collaboration with Kostas Kokkotas at the University of Tübingen). New observational facilities will hopefully detect gravitational waves within a few years and this will open a new window to study violent phenomena in our Universe. We want to use gravitational waves to test Einstein's theory of gravity.

For more details:

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