

Astronomical tests of General Relativity and the pseudo-complex field theory

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Gravitation is very well described by Einstein's General Relativity. However, several theoretical predictions like the existence of curvature singularities and event horizons are under debate. This motivated to modify the standard theory of gravity. Here, we contrast predictions made by General Relativity with the pseudo-complex field theory proposed recently. Among them we study the gravitational redshift effect, perihelion shift, orbital motion, timing measurements and spectral lines. We consider supermassive black holes as ideal testbeds to test the theoretical predictions in the regime of strong gravity. In particular, we investigate the innermost centers of active galaxies and the Galactic Centre. This involves high-performance astronomical instruments of the next generation. We present feasibility studies for existing X-ray missions and with the upcoming GRAVITY near-infrared instrument to be mounted at the Very Large Telescope.

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