The Radioastron as a tool with the highest angular resolution in radio band: Astrophysical applications

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In 2007 the RADIOASTRON space telescope will be launched and it will be a generalization of VLBI technique using the space – ground base. This interferometer will have the extraordinary angular resolution, namely $10^{-5}\ as - 10^{-6}\ as$ at 1.3 and 6 cm wavelenghts. We analyze the case of a Kerr black hole rotating at arbitrary speed for some selected positions of a distant observer with respect to the equatorial plane of a Kerr black hole. We propose to use future radio interferometer RADIOASTRON facilities to measure shapes of mirages (glories) and to evaluate the black hole spin as a function of the position angle of a distant observer. A similar approach which uses the characteristic properties of gravitational retro-lensing images can be followed to measure the charge of a Reissner-Nordström black hole (or magnetic monopole of black hole). Indeed, in spite of the fact that their formation might be problematic, charged black holes are objects of intensive investigations. From a theoretical point of view, it is well-known that a black hole is described by only three parameters, namely, its mass M, angular momentum J, and charge Q. Therefore, it would be important to have a method for measuring all these parameters, preferably by independent model of any. In this paper, we propose a procedure to measure the black hole charge by using the size of the retro-lensing images that can be revealed by future astrometrical missions. A discussion of the Kerr-Newmann black hole case is also offered.