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Shadows near supermassive black holes: from a theoretical concept to GR test

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Due to an expected progress of observational facilities Zakharov et al. (2005a) proposed to use global and ground – space VLBI observations in mm band to detect a shadow at Sgr A^* as a tool to evaluate a black hole spin and a position angle of distant observer. In particular, it was predicted that the shadow diameter is around 52 µas for the Sgr A^* case and this prediction was remarkably confirmed by the Event Horizon Telescope (EHT) Collaboration on 12 May 2022. Also Zakharov et al. (2005b) showed that a black hole charge can be evaluated from shadow size estimates. Zakharov (2014) generalized these relations for the tidal charge case. In 2019 the EHT Collaboration reconstructed shadows at M87^{*} in 2019 and at Sgr A^* in 2022. As it was shown by Zakharov (2022) a black hole charge can be found analytically from these observations.

References

Zakharov A. F. et al., New Astronomy 10, 479 (2005a) Zakharov A. F. et al., A & A 442, 795 (2005b) Zakharov A. F. , PRD 90, 062007 (2014) Zakharov A. F. , Universe 8, 141 (2022)

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