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On the Gravitational Redshift Detection in the Nucleus of NGC 4258

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By using a general relativistic approach to study Schwarzschild black hole (BH) rotation curves, we reveal the detection of the gravitational and the kinematic boosted redshifts in the strong gravitational regime of the Active Galactic Nucleus of NGC 4258, and estimate its BH mass-to-distance ratio in terms of astrophysical observable quantities.

The total relativistic redshift/blueshift comprises three components: the gravitational redshift due to the space-time curvature generated by the mass of the BH in its vicinity, the kinematic shift, originated by the photons' local Doppler effect, and the redshift due to a special relativistic boost that describes the motion of a galaxy from a distant observer.

We apply our method to the largest data set of highly redshifted water megamaser measurements on the accretion disk of the NGC 4258 active galaxy.

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