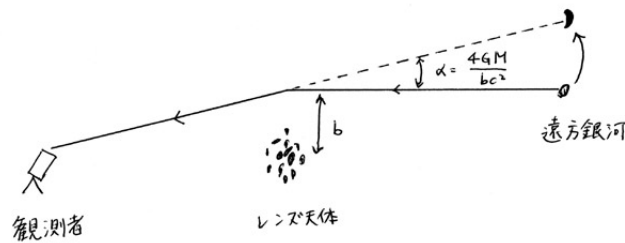


# Seeing dark matter and dark energy using gravitational lensing phenomena

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The gravitational lensing phenomenon is the deflection of light-rays emitted from distant galaxies by intervening massive objects along the same line of sight, which results from the warping of spacetime around the lensing object as described by Einstein's general theory of relativity. Measuring the gravitational lensing phenomena in the expanding universe allows us to “see” originally invisible objects, such as “dark matter” and “dark energy”.



$$(\text{重力レンズの強度}) = (\text{宇宙の幾何}) \times (\text{レンズ天体の質量})$$

A schematic illustration of gravitational lensing. The lensing strength in an expanding universe (A) is sensitive to the geometry of the universe (B) as well as the total matter of the lensing object (C); (A) = (B) × (C).