Electromagnetic Wave Motion Around a Black Hole

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How electromagnetic waves are affected by the geometry around a black hole can tell us important information about the black hole itself. By taking different variables that affect the geometry of the space around it, and how light is affected by said geometry or the potential of the black hole, we get the frequency and damping of the wave after interacting with the black hole, shown as ωr and ωi. We can calculate these frequencies for different values of mass and charge. Also, we can see how temperature is related to the frequencies of the electromagnetic waves. The properties of the black hole determine how it will affect the electromagnetic waves, so by understanding how each property affects them, we can see how changes in the electromagnetic waves indicate the specific properties of the black hole.