Gravitational birefringence of light

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We reconsider Saturnini's solution describing the gravitational lensing of spinning photons in the Schwarzschild metric using numerical and perturbative techniques. We find out that the polarisation state of light induces a very small angle on the trajectory. The angle depends on the wavelength. Therefore lensing features a rainbow effect. A more precise description requires a non-vanishing cosmological constant. We also compute the effect which polarisation of light has on gravitational wave detection.