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An eclipsing binary black hole in MRK 421

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A model independent power spectrum light curve analysis in the optical, hard X-ray and gamma-rays of the blazar MRK 421 shows clear evidence for a periodicity of approximately 400 days. A subsequent full maximum likelihood analysis fitting an eclipse model confirms this periodicity with a consistent phase for the bands analysed. The most parsimonious physical mechanism to which this periodicity could be ascribed is a dynamical effect produced by an orbiting supermassive black hole companion of mass of about 10^7 solar masses eclipsing the central black hole, which has an approximate mass of 10^8 solar masses.

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