

graviton

$$J = 2$$

OMITTED FROM SUMMARY TABLE

graviton MASS

All of the following limits are obtained assuming Yukawa potential in weak field limit. VANDAM 70 argue that a massive field cannot approach general relativity in the zero-mass limit; however, see GOLDHABER 74 and references therein. h_0 is the Hubble constant in units of $100 \text{ km s}^{-1} \text{ Mpc}^{-1}$.

| VALUE (eV) | DOCUMENT ID | COMMENT |
|---|---------------------------|----------------------------|
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● | | |
| $< 7 \times 10^{-32}$ | ¹ CHOUDHURY 04 | Weak gravitational lensing |
| $< 7.6 \times 10^{-20}$ | ² FINN 02 | Binary Pulsars |
| | ³ DAMOUR 91 | Binary pulsar PSR 1913+16 |
| $< 2 \times 10^{-29} h_0^{-1}$ | GOLDHABER 74 | Rich clusters |
| $< 7 \times 10^{-28}$ | HARE 73 | Galaxy |
| $< 8 \times 10^4$ | HARE 73 | 2γ decay |

¹ CHOUDHURY 04 sets limits based on nonobservation of a distortion in the measured values of the variance of the power spectrum.

² FINN 02 analyze the orbital decay rates of PSR B1913+16 and PSR B1534+12 with a possible graviton mass as a parameter. The combined frequentist mass limit is at 90%CL.

³ DAMOUR 91 is an analysis of the orbital period change in binary pulsar PSR 1913+16, and confirms the general relativity prediction to 0.8%. "The theoretical importance of the [rate of orbital period decay] measurement has long been recognized as a direct confirmation that the gravitational interaction propagates with velocity c (which is the immediate cause of the appearance of a damping force in the binary pulsar system) and thereby as a test of the existence of gravitational radiation and of its quadrupolar nature." TAYLOR 93 adds that orbital parameter studies now agree with general relativity to 0.5%, and set limits on the level of scalar contribution in the context of a family of tensor [spin 2]-biscalar theories.

graviton REFERENCES

| | | | |
|--------------|---------------|------------------------------|------------------------|
| CHOUDHURY 04 | ASP 21 559 | S.R. Choudhury <i>et al.</i> | (DELPH, MELB) |
| FINN 02 | PR D65 044022 | L.S. Finn, P.J. Sutton | |
| TAYLOR 93 | NAT 355 132 | J.N. Taylor <i>et al.</i> | (PRIN, ARCBO, BURE+) J |
| DAMOUR 91 | APJ 366 501 | T. Damour, J.H. Taylor | (BURE, MEUD, PRIN) |
| GOLDHABER 74 | PR D9 1119 | A.S. Goldhaber, M.M. Nieto | (LANL, STON) |
| HARE 73 | CJP 51 431 | M.G. Hare | (SASK) |
| VANDAM 70 | NP B22 397 | H. van Dam, M. Veltman | (UTRE) |