

Scientific Background on the Nobel Prize in Physics 2017

The Nobel Committee for Physics, 3 October 2017

https://www.nobelprize.org/nobel_prizes/physics/laureates/2017/advanced-physicsprize2017.pdf

“Distances in space increase and decrease with a steady cadence in two directions at 90 degrees to each other, orthogonal to the direction of motion of the wave.”

“In the case of gravitational radiation, energy conservation forbids monopole radiation, and momentum conservation forbids dipole radiation, leaving the quadrupole as the lowest multipole.”

“It was not until the late 1950’s that it was rigorously proven that the waves actually exist as solutions to the full non-linear equations, and that they carry energy [16-18].”

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[16] H. Bondi, F.A.E. Pirani and I. Robinson, Gravitational waves in general relativity III. Exact plane waves, *Proc. Roy. Soc. Lond.* A251, 519 (1959)

[17] F.A.E. Pirani, Invariant formulation of gravitational radiation theory, *Phys. Rev.* 105, 1089 (1957)

[18] I. Robinson and A. Trautman, Spherical gravitational waves, *Phys. Rev. Lett.* 4, 431 (1960); I. Robinson and A. Trautman, Some spherical gravitational waves in general relativity, *Proc. Roy. Soc. Lond.* A265, 463 (1962); A. Trautman, Boundary conditions at infinity for physical theories, *Bull. Acad. Polon. Sci.* 6, 403 (1958); A. Trautman, Radiation and boundary conditions in the theory of gravitation, *Bull. Acad. Polon. Sci.* 6, 407 (1958)

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Do gravitational waves (GWs) “actually exist as solutions to the full non-linear (Sic! – D.C.) equations”, and how would they “carry energy [16-18]”? How will you install GW “mirrors” at null-and-spacelike infinity? How will you define spacetime boundaries (cf. [R. Penrose](#)) at null-and-spacelike infinity to obtain ‘gravitationally isolated system’ and then prove “energy conservation” viz. speculate about “the quadrupole as the lowest multipole” (see [above](#))?

Have you seen pink unicorns dancing with red herrings? The Nobel Committee for Physics will be *very* happy to hear from you.

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