

Yvonne Choquet-Bruhat: a Mathematician in Einstein's Universe

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Yvonne Choquet-Bruhat has made fundamental contributions to both the mathematical and the physical understanding of Einstein's theory of gravitation. I will briefly summarize some of her achievements including:

1. The first proof of the existence of general (non-analytic) solutions of Einstein's theory, including the first rigorous proof that they involve propagation phenomena at the velocity of light, i.e. gravitational waves;
2. Studies of relativistic fluids and of relativistic magneto-hydrodynamics;
3. A study of the exceptional properties of strong high-frequency gravitational waves;
4. Positivity of mass in a neighborhood of Minkowski space;
5. Causality of supergravity and study of Gauss-Bonnet gravity;
6. Existence proofs for classes of cosmological spacetimes; and
7. New formulations of Einstein's equations proved crucial to the possibility of numerically simulating the motion and gravitational radiation of coalescing binary black holes.

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