Kommentarer från experter inom området

»This is the first measurement of the spin of a black hole by a novel method involving the twisting content of the radio waves received at the Earth. It shows that this supermassive black hole is spinning at nearly the maximum allowed value. It also shows that the propagation of the radio signal is strongly affected by the curvature of spacetime near the black hole.«

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»The work of Tamburini, Thidé, and Della Valle opens a new window into the Universe. They are the first to find evidence of one of the predictions of Einstein's General Relativity: twisted light (vorticity) from supermassive black hole M87, located in a galaxy more than 50 million light years away. They used radio data from the Event Horizon Telescope to make these measurements, and found that the black hole must be rotating at nearly the maximal speed allowed by Einstein's theory. Their work is complementary to our studies of the circularity of the black hole shadow seen by the EHT, where we showed that M87* could be rotating even more rapidly as a superspinar, allowed in theories such as string theory that go beyond Einstein's relativity. The high rotation rates found by Tamburini et al. imply that the black hole is the most energetic object in the Universe.«*

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»I think that this is an ingenious paper which manages to fully exploit the information carried out by the electromagnetic waves reaching us from the light ring of M87. It is the first time this technique can be applied thanks to the great work of the EHT collaboration, and I am sure that with better data more could be done (e.g. towards testing possible long range deviations from the Kerr geometry due to effects beyond general relativity). However, it is undeniable that this work shows the potential impact of a more accurate analysis of the light emitted by the inner regions close to the black hole horizon.«*

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»Being able to capture the shadow of a black hole is extremely exciting, but once that is done there are a few immediate questions to be answered, such as how heavy this object is and how fast it is spinning. This work addresses the second question in a really clever way, which also confirms a basic but not well known prediction of General Relativity.«

»This very interesting work shows that orbital angular momentum in the context of extreme regions of space-time such as rapidly spinning black holes works just as expected, which is not obvious a priori. This work and the earlier paper in Nature Physics it builds on have the potential to lay the foundations for a whole new field of research in theoretical and observational astrophysics. I can only wonder how many potential interesting applications might come out of it in the next years.«

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»Twisting of light is one of the more intriguing insights to emerge in physics in recent times, made all the more remarkable by the fact that both black holes and future telecommunications technologies may cause or exploit this twisting.«

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»The Universe talks to us and reveals its essence through electromagnetic and gravitational waves. With the deep understanding of these means of communication we can understand the language of Nature and in this work it demonstrates how through understanding the twisting of radio photons it is possible to measure the rotation of black holes as a highly innovative method.«

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