Possible experimental proof of Lorentz interpretation (LI) of GRT - further arguments

Poster DPG 2019

J. Brandes

Aachen, München 2019
jg-brandes (at) web.de
6.2.2019 Preliminary version
last update: 2019-03-18

1 Preliminary remark

LI of GRT [22] is a rational interpretation of classical GRT relying on mainstream physics. Nobel Prize winner Kip S. Thorne calls LI of GRT "the flat spacetime paradigm" of GRT [1], [2]. There is no difference in the predictions of relativistic experiments of both interpretations except, within LI of GRT black holes have no event horizon. Event horizon means: "A black hole is a region of spacetime exhibiting such strong gravitational effects that nothing - not even particles and electromagnetic radiation such as light - can escape from inside it."[3] Within LI of GRT such effects don't exist.

2 Possible experimental proof of Lorentz interpretation (LI) of GRT by ALMA VLBI

The most important event testing LI of GRT is described by the paper of S. Issaoun et al 'The Size, Shape, and Scattering of Sagittarius A* at 86 GHz: First VLBI with ALMA' [7] Commented by [8] – [10]. It gives a first image of SGR A* which allows a comparison with simulations e. g. of [5], [6]. Figure 1 shows the main result and is taken from [9].
It's easy to see from figure 1: The comparison of simulation and observation is discouraging for classical GRT and encouraging for LI of GRT. A central feature of the simulations is a black center - the shadow of the black hole - surrounded by white curls of the accretion disk, s. fig.1, upper left. Contrary, the observed image is bright and contains now visible black shadow, s. fig.1, lower left. It looks like a radiating massive object and this is predicted by LI of GRT [24], fig. 21.7. There are two arguments defending classical GRT:
a.) Possibly the shadow of the black hole is outshined by light from the accretion disk and the better resolution of the EHT (event horizon telescope) will correct it? Such an argument by specialists is missing and so, more probable the EHT measurements should confirm the measurements of S. Issaoun et al [7] and no shadow will be seen in the later observations, too..
b.) A (first) explanation of S. Issaoun and H. Falcke: "the radio jet is pointing almost at us" [10] and we are looking at a bright emission center hiding the shadow. A contrived model? More likely, the directions of total angular momentum of the galaxy and of SGR A* should be (more or less) the same. But such an argument confirms another view: There is no doubt that the BH simulations and the ALMA observations don't fit together.
So, the situation is encouraging for LI of GRT. The observed image is isotropic (nearly circular, no big difference between minor and major axis) and this is easily explained by LI of GRT since here SGR A* is a sphere having a certain brightness being surrounded by an accretion disk. The sphere of SGR A* is seen as a flat circle a little bit enlarged and distorted by the accretion disk.

3 Quantitative considerations of ALMA observations

"We find that the intrinsic image of SgrA∗ has an asymmetry (axial ratio) of 1.2+0.3 −0.2 and a major axis of 120 ±34 µas, although we cannot constrain the position angle because of the highly symmetric intrinsic source." [7]. So, the minor axis is 100 µas and should be comparable with the TOV calculation [21] yielding a sphere with radius $r = 1.56\, r_{sm}$
The diameter of the sphere d_{SGRA*}

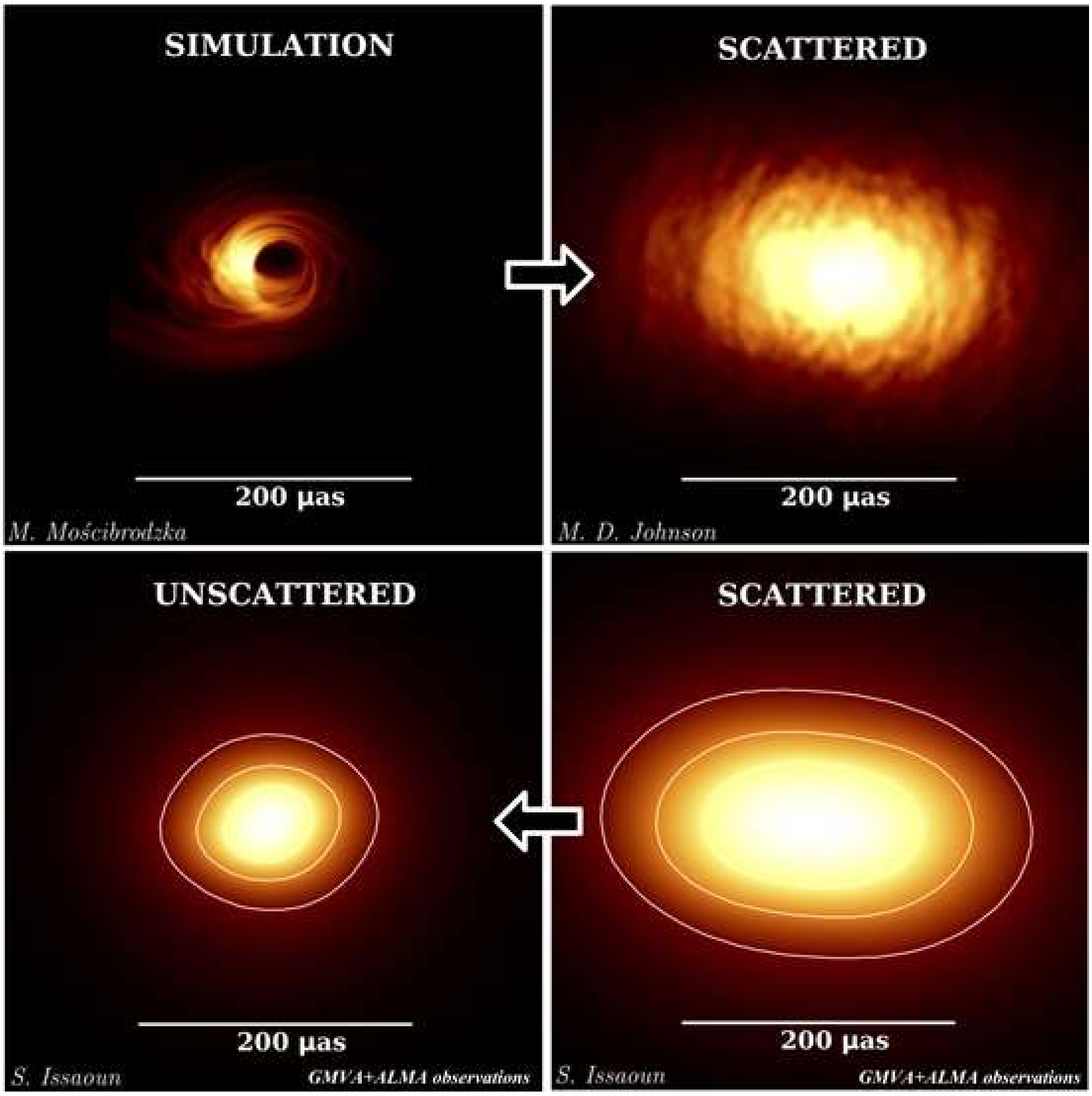
$$d_{SGRA*} = 2*1.56*r_{sm}$$

r_{sm} is seen from earth under 10 µas .Gravitational lensing yields a factor of 2.5. So, one gets

$$d_{SGRA*} / \mu as = 2*1.56*10*2,50$$

$$d_{SGRA*} = 78\,\mu as$$

This compared to the measured result of 100 µas is a rational result and one could do better by taking into consideration the dimensions of the accretion disk. **Even if more precise EHT observations would change the priorities the ALMA results prefer LI of GRT.**



Top left: simulation of Sgr A at 86 GHz. Top right: simulation with added effects of scattering. Bottom right: scattered image from the observations, this is how we see Sgr A* on the sky. Bottom left: the unscattered image, after removing the effects of scattering in our line of sight, this is how Sgr A* really looks like. Credit: S. Issaoun, M. Mościbrodzka, Radboud University/ M. D. Johnson, CfA*

Figure 1 Bottom left: this is how Sgr A* really looks like. Top left: simulation of Sgr A* at 86 GHz. Taken from [9]

4 Further arguments preferring LI of GRT

Some earlier ideas concerning experimental proof of LI of GRT see [23], some newer ones are listed below.

a.) Claiming that nothing can escape from a black hole then gravitational waves become difficult and *LI of GRT is proven:* In the case of GW170608 [4] the total mass of the binary system was 19 $M_\odot$ with components of 12 $M_\odot$ and 7 $M_\odot$. The final black hole mass was 18 $M_\odot$. This proves that mass as large as 1 $M_\odot$ escaped out of a black hole by gravitational waves and favors LI of GRT which allows it explicitly. [23], chapter 5.

b.) Van Putten et al [18] had a deeper look at the GW spectra of GW170817 and 'a black hole converted to a neutron star of 2.75 $M_\odot$.' Possibly, better measurements of the GW spectra generally prove that the end products possess features different from black holes. Comments by [19].

c.) Avery E. Broderick et al [11], [12] state: "That Sgr A* is indeed a black hole, i.e., contains a horizon, is implied by its spectral energy distribution (SED), which lacks the thermal bump associated with accretion onto a photosphere (Broderick & Narayan 2006; Broderick et al. 2009)." Certainly, LI of GRT needs to falsify this challenging argument. First ideas: SGR A* is a supermassive degenerate star [23]. The chemical potential (Fermi potential μ_F) is different from zero, the kinetic energy of the infalling particles is converted to enlarge the object and is not thermalized. Further: Light emission from a degenerate object is more likely similar to LED than thermal. The magnetic fields create synchrotron radiation which is not thermal.

d.) R. Pasham et al [13]. First idea: the quasi-periodicity and its increasing rms - Figure S11 – is connected with the rotating surface of the central SMO. Comments by [14].

e.) N. Paul et al [15] First idea: Tidal disruption events are one explanation, LI of GRT also allows meteoroid like hits on the (counter rotating) surface of the central SMO. Their released energy might be bigger. Comments by [16], [17].

5 Literature

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