Pulsating Neutron Stars

Wolfgang Kundt - Bonn, 17 February 2020

1. In this seminar room, Michael Kramer once told us that there ought to be hundreds of pulsars inside of the central degree of our Galaxy, but only one magnetar had been detected so far. My explanation: The central Galactic gas pressure is too high for them to blow their wind zones, so they cannot pulse there.

2. Again in this seminar room, Frank Eisenhauer showed us, on 16.9.2007, that the star S2 had precessed by 3 deg during its first periastron passage around Sgr A^*, implying a super-SMBH extent of Sgr A*, (of mass $10^{6.6}$ $M_\odot$, [see my red book, page 265]).

3. Sgr A* is located at the center of our Milky Way disk, in which (mostly) hydrogen spirals in and gets ignited (by compression). It thereby reverses the mass infall into our Galaxy's center, $\lesssim M_\odot$/ yr - via nuclear detonations - as is similarly known to happen for some further 10^4 galaxies from the SDSS plot, or even more recently for a million galaxies in our Universe from the Messenger No.175, p.42, (2019). I therefore called Sgr A^* a "Burning Disk" =: BD in 1978, and received 'Honorable Mention' for it. It has been seen (by 1984) to blow the atmospheres radially off $\gtrsim 8$ stars within 10" of it; apparently, Sgr A^* is likewise responsible for blowing our Galaxy's BLR, NLR, EEL, and ELR, which in turn feed their (surrounding) 'Ly α Forest'. Evidently, its role in the cosmic evolution is opposite to that of a SMBH: it blows - rather than swallows. See also my publications: 88, 90, 127 (with M.Krause), 176, 207, 225, 275, & 292, all of which deal with this same problem. Let me mention that different, inconsistent observational results on Sgr A^* and S2 have been recently published in the two Messengers 173, p.37 (2018), and 178, p.28 (2019), whose authors are not given.

4. Neutron star winds cannot be blown thermally: their matter is too tightly bound: 10^{-1} rest energy; they are blown electrically – via (β x B)-forces - by periodical bombardment of their surfaces with electrons of oscillating sign of electric charge - at $\gtrsim$ μsec periods - and by implied pair formations.

5. Neutron star magnetospheres are likely formed by somewhat inclined, and displaced magnetic dipoles, split into axi-parallel pairs of quadrupoles, but further distorted, with hardly any two of them equal-shaped; cf. our Sun. They have been shown to blow in all directions.

6. Observational evidences for the existence of pulsar winds are: occasional bow shocks, and the pulsars' coherent and incoherent radiation, and: their emission of most of the CRs, and their emission of most of the GRBs. See also my 2015 Mondello talk, called "How do Pulsars blow their Winds?".