

The Evidence of Magnetic Monopoles by Astronomical Observation and Its Astrophysical Implication

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A key observation has been reported in 2013 (Eatough et al., 2013): an abnormally strong radial magnetic field near the GC is discovered.

Firstly, we demonstrate that the radiations observed from the GC are hardly emitted by the gas of accretion disk which is prevented from approaching to the GC by the abnormally strong radial magnetic field and these radiations can't be emitted by the black hole model at the Center. However, the dilemma of the black hole model at the GC be naturally solved in our model of super massive object with magnetic monopoles (MMs) (Peng and Chou 2001). Three predictions in our model are quantitatively in agreement with observations:

1) Plenty of positrons are produced from the direction of the GC with the rate is $610(42) e+/\text{sec}$ or so. *This prediction is quantitatively confirmed by observation (3.4-6.3)10(42) e+/\text{sec}*. 2) **A strong radial magnetic field is generated by some magnetic monopoles condensed in the core region of the super massive object The magnetic field strength at the surface of the object is about 20-100 Gauss at $1.1 \times 10^4 R_s$ (R_s is the Schwarzschild radius) or (10-50)mG at 0.12 pc . This prediction is quantitatively in agreement with the lower limit of the observed magnetic field $>8\text{mG}$ (Eatough et al.2013); 3) The surface temperature of the super-massive object in the Galactic center is about 120 K and the corresponding spectrum peak of the thermal radiation is at 10^{13}Hz in the sub-mm wavelength regime. This is quantitatively basically consistent with the recent observation (Falcke and Marko, 2013).**

The Conclusions are: It could be an astronomical observational evidence of the existence of MMs and no black hole is at the GC .

Making use of both the estimations for the space flux of MMs and nucleon decay catalyzed by MMs (called the RC effect) to obtain the luminosity of celestial objects by the RC effect. In terms of the formula for this RC luminosity we are able to present a unified treatment for various kinds of core collapsed supernovae , SNIi, SNIb, SNIc, SLSN (Super Luminous Supernova) and the production mechanism for γ ray burst. The remnant of the supernova explosion is a neutron star rather than a black hole, regardless of the mass of the progenitor of the supernova. Besides, the heat source of the Earth's core as well as the energy source needed for the white dwarf interior are the same mechanism of the energy source as supernova. This unified model can also be used to reasonably explain the possible association of the shot γ ray burst detected by the Fermi γ ray Burst Monitoring Satellite (GBM) with the September 2015 LIGO gravitational wave event GW150914.

Finally, We propose that the physical mechanism of Hot Big Bang of the Universe is also nucleons decay driven by the magnetic monopoles, similar to the supernova explosion.

[1] Qiu-He Peng, Jing-Jing Liu and Chi-Kang Chou, 2016, "A possible influence on standard model of quasars and active galactic nuclei in strong magnetic field", *Astrophys Space Sci* (2016) 361:388

[2] Qiuhe Peng, Jing-Jing Liu and Chi-Kang Chou, 2017, "A unified model of supernova driven by magnetic monopoles" *Astrophys Space Sci* (2017) 362:222

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