

# Gravitational anti-screenings around galaxies and dark matter (DM) halos in the composite–supersymmetric superfluid quantum vacuum of the periodic waveguided multiverse (PWM)

I A Gribov, ITNE, E-mail: [jgribov@yandex.ru](mailto:jgribov@yandex.ru)

## ***POSTULATED 4D-PWM STRUCTURE***

$L_0$ -periodic 3D-waveguided multiverse - *co-interacting identical* flat parallel 3D-waveguides – 3D-universes  $W_n$ : ...  $W(-3)$ ;  $W(-2)$ ;  $W(-1)$ ;  $W(0)$ ;  $W(1)$ ;  $W(2)$ ;  $W(3)$ ... ,  $L_0 = \lambda$  (electron Compton) in Euclidean 4<sup>th</sup> space dimension  $L$ .

The resulting ***PWM-CO-EMERGENT intrinsically identical quantized rest mass particles of:***

- (1) Ordinary matter ***W(0)-OM***-universe;
- (2) two visible antimatter ***W(-1;+1)-AM***-antiuniverses;
- (3) two dark matter ***W(-2;+2)-DM***-universes,
- (4) two dark antimatter ***W(-3;3)-DAM***-antiuniverses, etc;

with the co-emergent pure 3D-waveguided special relativity ***3D-SR***; the quantum mechanics ***3D-QM***; the co-emergent PWM-expanded equivalence principle ***3D-EP*** and the PWM-expanded general relativity ***3D-GR*** for the quantized 3D-massive 3D-waveguided normal modes [1-2].

## ***BASIC PWM-PREDICTIONS***

*The periodic OM-AM antigravity as the cosmic dark energy nature* [1-3];

*The DM-particles are dark DM-photons, DM-baryons, and DM-electrons, etc* [1-2];

*The OM-DM mediators are AM-particles* [1-2].

*The stable singularity-free PWM black holes holding the baryon conservation law* [2].

## ***THE NOVEL MULIVERSAL PICTURE OF OUR PHYSICAL WORLD***

- (a) ***Superfluid quantum vacuum-medium*** - weightless-composite (fermion-anti-fermion dipoles).
- (b) OM-AM-fermions as rare ***OM/OM-holes-quasiparticles*** - decoupled (f./anti-f.)-dipoles.
- (c) The ***gravitational anti-screening*** in big OM-, AM-, DM-galaxies, creating DM-like halos.
- (d) The ***unbroken supersymmetry (SUSY)*** of the PWM-vacuum (***zero cosmological constant***).
- (e) The ***unbroken OM-AM symmetry*** on the large-scale universe [3-4].
- (e) The ***PWM-vacuum--particles paradigm inversion*** simultaneously explains the miracle QM-phenomena: The nature of probabilistic QM-behavior; the double-slit experiment; the entanglement phenomena; Pauli exclusion and Heisenberg uncertainty principles in the PWM-vacuum.

[1] Gribov I.A. 2019 ***Periodic waveguided multiverse as a source of dark matter and dark energy***. *J. Phys.: Conf. Ser.* 1147 012083. <http://iopscience.iop.org/article/10.1088/1742-6596/1147/1/012083/pdf>

[2] Gribov I.A. 2021 ***Singularity-free stable black holes, holding the baryon conservation law in the periodic waveguided multiverse*** *J. Phys.: Conf. Ser.* 1787 012040 <https://iopscience.iop.org/article/10.1088/1742-6596/1787/1/012040/pdf>

[3] I A Gribov and S A Trigger. 2016. ***Gravitationally neutral dark matter – dark antimatter universe crystal with epochs of decelerated and accelerated expansion***. In: XXXI International Conference on Equations of State for Matter (ELBRUS2016) IOP Publishing Journal of Physics: Conference Series 774. <http://iopscience.iop.org/article/10.1088/1742-6596/774/1/012045/pdf>

[4] Gribov I.A., Trigger S.A. 2018 ***The gravitational-optical methods for examination of the hypothesis about galaxies and antigalaxies in the Universe*** *J. Phys.: Conf. Ser.* 946 012020 <https://iopscience.iop.org/article/10.1088/1742-6596/946/1/012020/pdf>