

# **Title : The introduction of Additional Spacetime Distortions(ASD) and New interpretations learned from it**

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This is a preprint of a work in progress. The author(Kim, Jae Un) are actively developing the full paper. to explain the connection between ASD and dark matter, full paper will explain the current problems of dark matter by solving them to express the connection between ASD and dark matter more.

## **Introduction**

Unexplained phenomena persist in the universe to this day. Examples include black holes, the Big Bang, Space expansion, Dark matter, Dark energy, etc. as one of them, Dark matter poses significant challenges to direct observation. this paper aims to reveal aspects of true nature that Dark matter has. first of all, ASD is fundamentally defined as the non-linear overlapping of spacetime distortions, formed by the temporal and spatial positions and configurations of physical matters.

When the several(more than two) Spacetime Distortions fields affect One another, changing the spacetime distortion in a non-linear way. changing the spacetime distortion results in gravitational lensing just like dark matter without mass. this paper argue that ASD itself is dark matter. Based on ASD, we present explanations and interpretations of several known dark matter problems to date.

Furthermore, this paper suggests a direct experimental method to validate our interpretations, the experimental outcomes not only confirm the theoretical consistency but also enable the visualization and amplification of four-dimensional spacetime distortions. And also presents the new observation method of internal information of black holes.

## Foundation Equations Of Non-linear Overlapping

For nonlinear Overlapping of spacetime distortion fields, we start with Einstein's field equations:

$$G_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

Here, the terms are defined as follows:

- $G_{\mu\nu}$  : Einstein tensor (describes spacetime curvature)
- $T_{\mu\nu}$  : Energy-momentum tensor (governs the effect of matter on spacetime)
- $G$  : Gravitational constant
- $c$  : Speed of light

Considering the overlapping of distortion fields, we extend Einstein's equation to incorporate nonlinear effects:

$$G_{\mu\nu}^{(1)} + G_{\mu\nu}^{(2)} + \lambda G_{\mu\nu}^{(1)} G_{\mu\nu}^{(2)} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

where  $\lambda$  represents the nonlinearity coefficient in gravitational interactions.

The Ricci curvature tensor is given by:

$$R_{\mu\nu} = \partial_\alpha \Gamma_{\mu\nu}^\alpha - \partial_\nu \Gamma_{\mu\alpha}^\alpha + \Gamma_{\mu\nu}^\alpha \Gamma_{\alpha\beta}^\beta - \Gamma_{\mu\beta}^\alpha \Gamma_{\alpha\nu}^\beta$$

With overlapping effects, an additional nonlinear term is introduced:

$$R_{\mu\nu} = R_{\mu\nu}^{(1)} + R_{\mu\nu}^{(2)} + \lambda \left( R_{\mu\nu}^{(1)} R_{\mu\nu}^{(2)} + \Gamma_{\mu\nu}^\alpha \Gamma_{\alpha\beta}^\beta \right)$$

this simply show that, upon interaction, the Ricci curvature becomes non-linear overlapping with an added non-linear term rather than a simple overlapping.

## **The Core and Dark matter is interpreted by the ASD perspective**

It is almost confirmed that the interpretation of dark matter to date has the most particle-level interpretation. It is an interpretation from the viewpoint of the existence of a particle that is invisible but exerts gravity. However, this study no longer sees dark matter as a particle, presents a new frame by interpreting dark matter as a Spacetime phenomenon by non-linear overlapping of Spacetime distortion Fields and I think the Biggest reason for creating it is positions and arrangements. and We suggest that the phenomenon of dark matter can be explained by this non-linear overlapping. It does not interact with light, but it exerts gravity, which is very much the same. In order to show its consistency, we will also describe the process of solving various problems related to dark matter that have not been solved at present.

## **Introduction of the Degree of Interaction I, interpretation of existing dark matter problems and description of dark matter being ASD**

We have discovered a characteristic pattern in dark matter phenomena that is difficult to capture with conventional theories. To understand and explain the nature of these phenomena, this work introduces "degrees of interaction I". Although there is currently no clear methodology for quantification, this concept is considered essential to provide deep insights into the dark matter distribution.

I is also divided into Istable(Is), Imax(Im), and Inone(In).

Is is a region where the degree of interaction is appropriate and thus does not affect the distribution of dark matter, i.e., the region where ASD is stable.

Im is a region where there is a degree of interaction just before it starts to affect the distribution of dark matter. m means max.

Finally, In refers to an area where there is too much interaction in that area to allow the distribution of dark matter.

## **The presentation of experimental methods and what we know from experiments**

The gravitational lens effect is a phenomenon in which a large celestial body bends Spacetime and change the path of light. It is generally observed in large masses such as galaxy clusters and black holes, but there is a possibility that can artificially form a Overlapping point and visualize it at a close distance. In this study, juse two massive objects are placed, spatial distortion between the two mass is checked with gravitational lenses and atomic clocks, and the artificial light source and artificial lens effect are checked, Visualization and enlargement of gravitational lens effects through an artificial way is enough possible. the fact that it can be confirmed in all directions means that space-time distortion can be viewed in three dimensions. We've only seen it in one direction so far

## **A new method is presented for black hole observations**

It is a very difficult task to observe the internal mass from the effect of the gravitational lens. Then you can change your perspective and find Additional Spacetime Distortion. There is a very high probability. During the interaction of two black holes, their respective Spacetime distortion points are quite wide and strong. Even a slight overlap between these distortions is expected to reveal the effect, though such an event may be very short-lived. Nevertheless, the ability to deduce information about their internal mass holds significant theoretical importance.