

Spacetime fuzziness and parity symmetry breaking: unveiling the Universe's secrets

The National Doctorate in Space Science and Technology is a doctoral program spanning across Italy with seven different curricula that cover various scientific fields related to space, ranging from Early Universe Cosmology to medical sciences applied to astronaut health, and even space diplomacy. The DN-SST program began last year with the XXXVIII cycle and up to this point, I am the only student from Naples involved in this program. Within this framework, I'm involved with a scholarship in Cosmology with the name "Constraints from space borne observations of the cosmic microwave background and of the large scale structure of the Universe", with operational site in the Cosmology group of the University of Ferrara.

Naples is my hometown, and the University of Naples Federico II has been my alma mater, where I acquired the knowledge and skills necessary to be a part of the scientific community. For this reason I would like here to show you the research which still links me with Naples, about Quantum Gravity and Noncommutative Geometry, which I started during my master's thesis work. Defining the fuzziness of the spacetime structure, is it possible to have a macroscopic evidence of it in relativistic compact objects? If so, how?

Nevertheless, I also would like to talk about my current research in Cosmology: what happens when a scalar field, which once it has filled the spacetime up to a certain point in the Universe history, couples with the electromagnetic field breaking the latter's parity symmetry? Have we observed evidence of this in recent precision experiments? How would it impact our understanding of the standard model of physics if we found it?

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