Our Team

Won Sang Cho

Research Area: Theoretical Physics

Postdoc

My main research interests are collider and dark matter phenomenology in new physics beyond the Standard Model. In particular, I have been greatly interested in the mass and spin measurement of dark matter and new particles as research topics, with the goal of establishing a systematic means of verifying and establishing the specifications of new physics models. At IPMU, I will attempt to find connections between new observables and new physics with the progress of the LHC experiment as well as forthcoming observations in astrophysics and cosmology.

Johanna Knapp

Research Area: Theoretical Physics

Postdoc

String theory requires a ten-dimensional space-time. In order to make contact with our four-dimensional world, six of these dimensions have to be made compact and very small. The structure of the compact space governs the physics in four dimensions. For the construction of realistic string models it is essential to understand what happens in the extra dimensions. The main focus of my research is to learn about the mathematical structure of the compact dimensions, and to explore dualities, such as mirror symmetry, which relate different string compactifications.

Takahiro Nishimichi

Research Area: Astrophysics

Postdoc

I am working on a large-scale structure of the universe traced by millions of galaxies using large computer simulations. I am primarily trying to develop methodologies to extract information about two eras of accelerating expansion of the universe, caused by unknown dark energy and inflation. I aim to model the statistical properties of the galaxy spatial distribution with unprecedented accuracy to make full use of the data from huge upcoming observational projects.

Masaomi Tanaka

Research Area: Astronomy

Postdoc

It is known that some stars in the sky end their life in the brilliant explosion of a supernova. The mechanism of the supernova explosion, however, has long been a mystery in astronomy. I've been working on observations of supernovae using large, modern telescopes. As a result, complex three-dimensional geometry, surely a key to understanding the explosion mechanism, has become apparent. I'm also interested in numerical simulations and observations of supernovae in the distant, early universe.

Masahito Yamazaki

Research Area: Theoretical Physics

Postdoc

My primary field of study is string theory. My recent research has focused on state-counting problems in string theory. This is important from the perspective of black hole microstates and string duality. We proposed a new statistical mechanical model of crystal melting which gives exact answers to this question, and clarified its connection with the topological string theory. This work also gives new predictions for mathematical invariants, and I have worked closely with mathematicians.