Objective

This proposal is a part of ongoing global efforts to understand the most fundamental elements of matter and their interactions. We aim to investigate neutrino interactions using the existing experimental facility in Japan, the Super-Kamiokande (SK) detector located in the Kamioka Observatory (Gifu Prefecture) and owned by the Partner of this Project: the Institute for Cosmic Ray Research of the University of Tokyo.

Furthermore, we propose a joint work on the design and construction of new neutrino detectors planned at the Kamioka Observatory. They are Gadzooks! (and its R&D program EGADS), that is an extension to SK, and Hyper-Kamiokande (HK), its next generation detector. These Projects are currently ongoing and in preparation phase, respectively.

We address several fundamental problems in physics. We do it at different stages: by
analyzing the data from SK, by building and commissioning Gadzooks!, and by designing HK:
• Neutrino Oscillations – neutrino mass hierarchy (SK, Gadzooks!, HK), leptonic Charge-Parity violation (HK), precise measurement of mixing parameters (SK, Gadzooks!, HK),
• Dark Matter – search for neutrinos induced by dark matter annihilation/decay in the cosmic space (SK, HK),
• Nearby Galactic Supernova Physics – measurement of neutrinos emitted in the burst (SK, Gadzooks!, HK),
• Diffuse Supernova Neutrino Background – discovery (Gadzooks!) and energy spectrum measurement (HK),
• Grand Unification – search for proton decay (SK, Gadzooks!, HK).

Seconded researchers will work in Japan on those investigations. The collaborative work with the leaders of the field, the Japanese Groups and Research Facilities, should assure the researches and the Participants Groups the gain of an invaluable experience from these studies, covering neutrino physics, cosmology, astrophysics, technical design, construction and operation of water Cherenkov detectors, data analysis techniques, hardware and software development for the new generation detectors.

Field of science

/natural sciences/computer and information sciences/software/software development
/natural sciences/computer and information sciences/software
/natural sciences/physical sciences/astronomy/stellar astronomy/supernova
/natural sciences/physical sciences/astronomy/astrophysics
/natural sciences/physical sciences/astronomy/physical cosmology
/natural sciences/computer and information sciences/data science/data analysis
/natural sciences/physical sciences/astronomy/astrophysics/dark matter

Programme(s)

Topic(s)

Call for proposal

H2020-MSCA-RISE-2014

Funding Scheme
Funding Scheme

MSCA-RISE - Marie Skłodowska-Curie Research and Innovation Staff Exchange (RISE)

Coordinator

<table>
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<th>Organization</th>
<th>Address</th>
<th>Activity type</th>
<th>EU contribution</th>
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<tbody>
<tr>
<td>UNIVERSIDAD AUTONOMA DE MADRID</td>
<td>Calle Einstein 3 Ciudad Univ Cantoblanco Rectorado 28049 Madrid Spain</td>
<td>Higher or Secondary Education Establishments</td>
<td>€ 193 500</td>
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Participants (2)

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<td>NARODOWE CENTRUM BADAN JADROWYCH</td>
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Partners (1)

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<tr>
<td>NATIONAL UNIVERSITY CORPORATION THEUNIVERSITY OF TOKYO</td>
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