White Papers for experiments

IceCube-Gen2

IceCube-Gen2: A Vision for the Future of Neutrino Astronomy in Antarctica

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- **20 pages**
- 1 page executive summary
- 7 pages summary of IceCube status
- 9 pages (5 Figures) dedicated to IceCube-Gen2

- abstract

The recent observation by the IceCube neutrino observatory of an astrophysical flux of neutrinos represents the "first light" in the nascent field of neutrino astronomy. The observed diffuse neutrino flux seems to suggest a much larger level of hadronic activity in the non-thermal universe than previously thought and suggests a rich discovery potential for a larger neutrino observatory. This document presents a vision for an substantial expansion of the current IceCube detector, *IceCube-Gen2*, including the aim of instrumenting a $10\,\mathrm{km}^3$ volume of clear glacial ice at the South Pole to deliver substantial increases in the astrophysical neutrino sample for all flavors. A detector of this size would have a rich physics program with the goal to resolve the sources of these astrophysical neutrinos, discover GZK neutrinos, and be a leading observatory in future multi-messenger astronomy programs.

EUSO-SPB2

White paper on EUSO-SPB2

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Abstract

EUSO-SPB2 is a second generation Extreme Universe Space Observatory (EUSO) on a Supe
Pressure Balloon (SPB). This document describes the physics capabilities, the proposed technic
design of the instruments, and the simulation and analysis software.

- **52 pages**
- 10 pages science case
- 27 pages design/simulations
- 1 page schedule, data management

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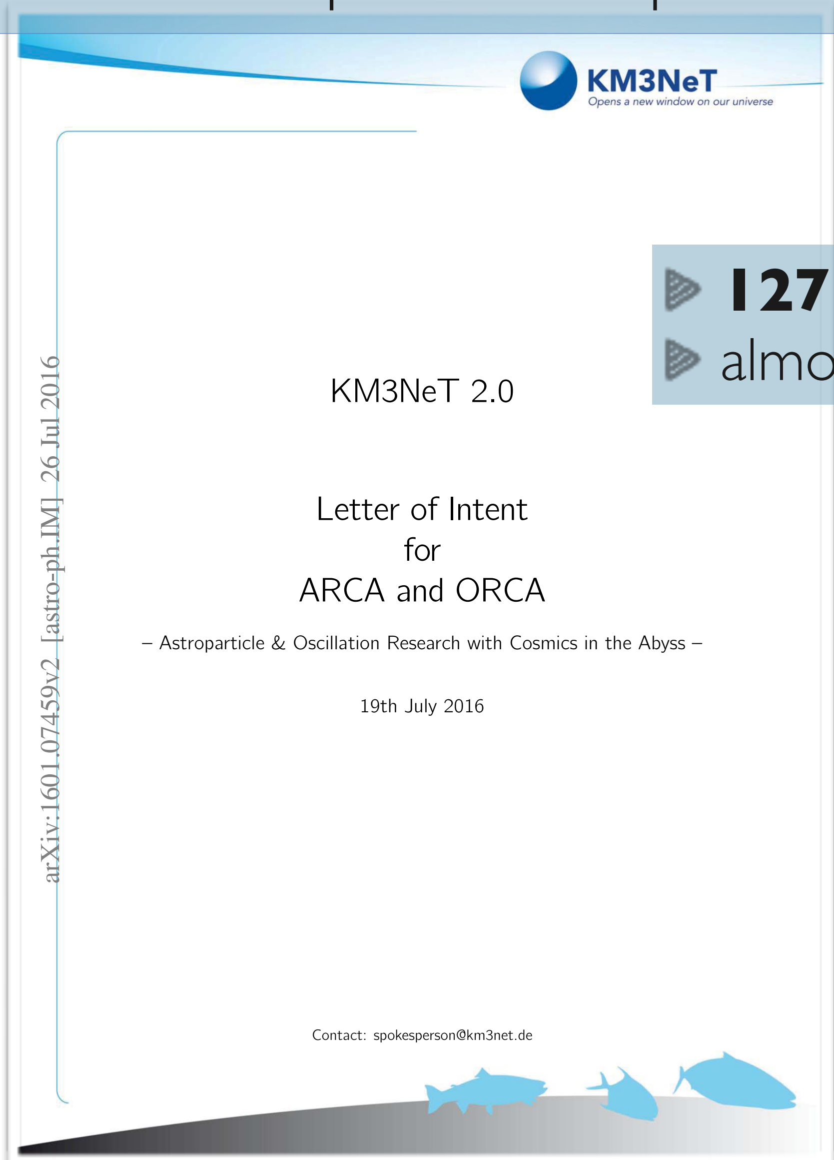
White Papers for experiments

KM3NeT


KM3NeT
Opens a new window on our universe

arXiv:1601.07459v2 [astro-ph.IM] 26 Jul 2016

KM3NeT 2.0

Letter of Intent
for
ARCA and ORCA

– Astroparticle & Oscillation Research with Cosmics in the Abyss –

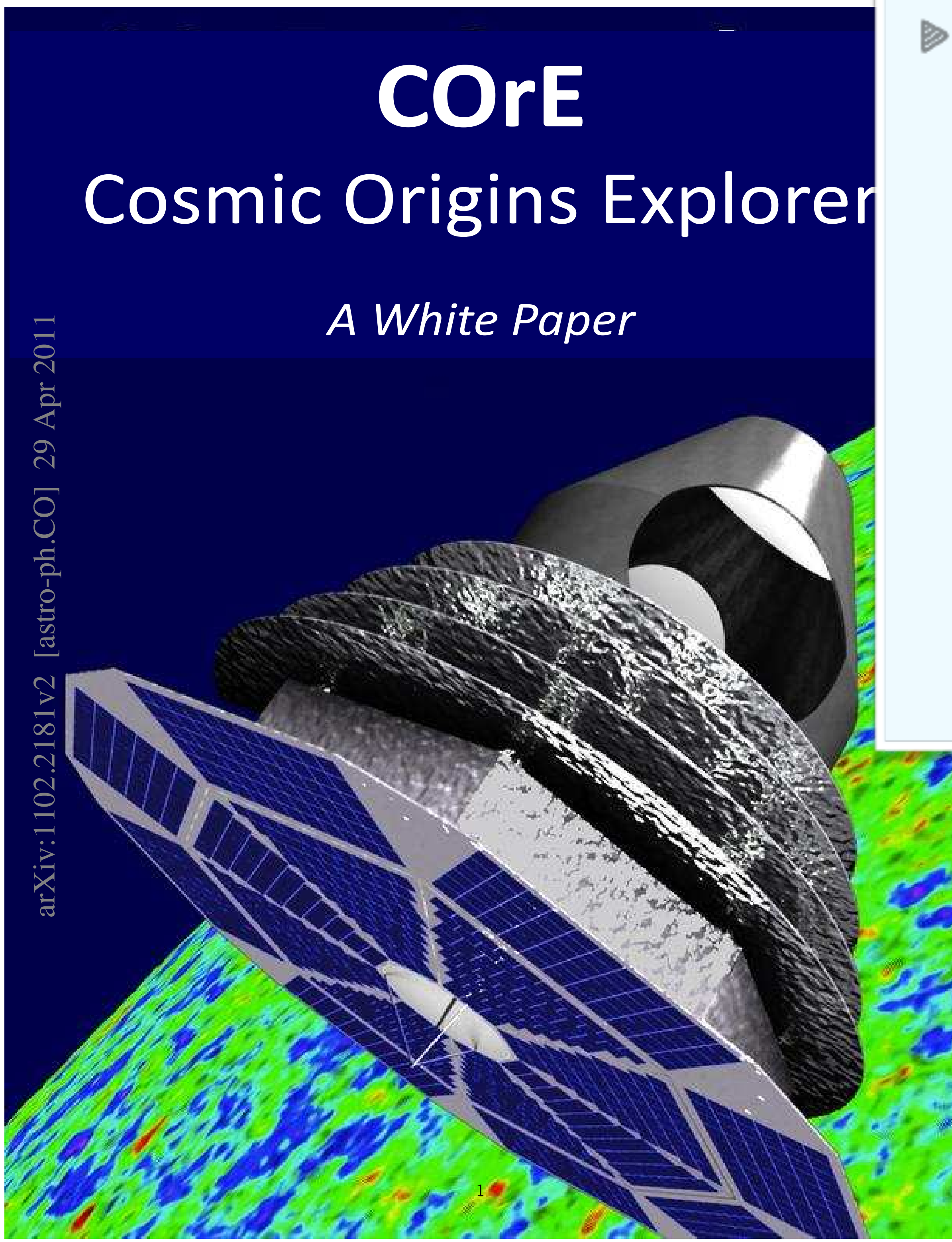
19th July 2016

Contact: spokesperson@km3net.de

- **127 pages**
- almost no Science Case

Contents

COrE



- abstract

COrE (Cosmic Origins Explorer) is a fourth-generation full-sky, microwave-band satellite recently proposed to ESA within Cosmic Vision 2015-2025. COrE will map the polarization of the microwave sky with such a high precision that tensor modes produced by the inflationary expansion are detected at more than 3σ even if they are 0.1% of the scalar modes. This is a factor about 50 times better than what PLANCK can achieve. COrE will provide maps of the microwave sky in 15 frequency bands, ranging from 45 GHz to 795 GHz, with an angular resolution ranging from 23 arcmin (45 GHz) to 1.3 arcmin (795 GHz) and sensitivities roughly 10–30 times better than PLANCK (depending on the frequency channel). The COrE mission will lead to breakthrough science in a wide range of areas, from primordial cosmology to galactic and extragalactic science. COrE is designed to detect the primordial gravitational waves generated during the epoch of cosmic inflation at more than 3σ for $r = (T/S) \geq 10^{-3}$. It will also measure the CMB gravitational lensing deflection power spectrum to the cosmic variance limit on all linear scales, allowing us to probe absolute neutrino masses better than laboratory experiments and down to plausible values suggested by the neutrino oscillation data. COrE will also search for primordial non-Gaussianity with significant improvements over PLANCK in its ability to constrain the shape and amplitude of non-Gaussianity. In the areas of galactic and extragalactic science, in its highest frequency channels COrE will provide maps of the galactic polarized dust emission allowing us to map the galactic magnetic field in areas of diffuse emission not otherwise accessible to probe the initial conditions for star formation. COrE will also map the galactic synchrotron emission thirty times better than PLANCK. This White Paper reviews the COrE science program, our simulations on foreground subtraction, and the proposed instrumental configuration.

- **91 pages**
- 40 pages Science Case
- 15 pages Science requirements
- 35 pages COrE instrument

White Papers for experiments

CTA

▶ **213 pages** for Science Case

▶ **54 pages** for INAF

(Artist view of CTA - courtesy of CTA Collaboration.)

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- What I liked

- when I can get the information I need to write a theory paper from the executive summary
- synthetic science case overview tightly connected to the experiment (IceCube-Gen2, EUSO-SPB)
- developed ideas on a variety of aspects of technical design, with dedicated plots/illustrations

- What I didn't like

- when it looked like a merged version of individual reviews on various topics, not necessarily connected to the experiment (CTA)
- the science case part takes too much of the paper (as if there wasn't much to say about the technical design) (COrE)
- obscure and too detailed technical design, with features not necessary to understanding of instrument

- Some propositions

- focus more content and sections on GRAND? (e.g., remove plots taken from other papers that are not GRAND-specific)
- downplay a bit more the science case part
- add Appendix where pedagogical content could go?

- re-structure: treat each science topic comprehensively (neutrinos/UHECRs/gamma/FRBs/EoR)