

# Paolo Desiati

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## Work address

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University of Wisconsin – Madison (UW–Madison)  
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## Education

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<b>MSc.</b>	<i>Physics (Laurea in Fisica)</i> <b>Università degli Studi di Firenze</b> , Florence, Italy	1989 – 1994
	<i>compulsory military service</i>	1994 – 1995
<b>PhD</b>	<i>Physics (Dottorato in Fisica)</i> <b>Sapienza – Università di Roma</b> , Roma, Italy	1996 – 1999

## Appointments

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<b>Undergraduate Research</b>	Gran Sasso Nat. Lab. – Italy
<ul style="list-style-type: none"><li>• One-year fellowship by INFN for cosmic-ray research</li></ul>	1993 – 1994
<b>Research Associate</b>	DESY-Zeuthen – Germany
<ul style="list-style-type: none"><li>• Two-year Reimar Lüst stipend from Körber Stiftung, Hamburg, for post-doctoral astrophysics research with the AMANDA neutrino telescope</li></ul>	1999 – 2001
<b>Research Associate</b>	Madison, WI
<ul style="list-style-type: none"><li>• Neutrino analyses and simulation production with AMANDA</li></ul>	2001 – 2003
<b>Assistant Researcher</b>	Madison, WI
<ul style="list-style-type: none"><li>• Cosmic-ray science analyses with the IceCube Neutrino Observatory</li><li>• Maintenance and Operations (M&amp;O) with IceCube</li></ul>	2003 – 2006
<b>Associate Researcher</b>	Madison, WI
	2006 – 2010
<b>Associate Scientist</b>	Madison, WI
	2010 – 2013
<b>Senior Scientist</b>	Madison, WI
<ul style="list-style-type: none"><li>• Cosmic-ray science analyses with IceCube</li><li>• Coordination between M&amp;O and science working groups in IceCube</li></ul>	2013 – 2022
<b>Assistant Research Professor</b>	Madison, WI
<ul style="list-style-type: none"><li>• PI of cosmic-ray analyses with IceCube at UW–Madison</li><li>• PI of cosmic-ray analyses in the US with HAWC at UW–Madison</li><li>• Member of the cosmic-ray science task force in the SWGO collaboration</li></ul>	2022 – today

## Most Relevant Publications

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<b>All-sky Measurement of the Anisotropy of Cosmic Rays at 10 TeV and Mapping of the Local Interstellar Magnetic Field</b>	Jan 2019
HAWC & IceCube collaborations	

<a href="https://doi.org/10.3847/1538-4357/aaf5cc">10.3847/1538-4357/aaf5cc</a>	<b>Anisotropy from the Magnetic Field at the Heliospheric Boundary</b>	Jun 2017
López-Barquero V., Xu S., <b>Desiati P.</b> , Lazarian A., Pogorelov N., Yan H.		
<a href="https://doi.org/10.3847/1538-4357/aa74d1">10.3847/1538-4357/aa74d1</a>	<b>Anisotropy in Cosmic-Ray Arrival Directions in the Southern Hemisphere Based on Six Years of Data From the IceCube Detector</b>	Aug 2016
IceCube collaboration		
<a href="https://doi.org/10.3847/0004-637X/826/2/220">10.3847/0004-637X/826/2/220</a>	<b>Maximum-Likelihood Technique for Reconstructing Cosmic-Ray Anisotropy at All Angular Scales</b>	May 2016
Ahlers M., BenZvi S., <b>Desiati P.</b> , Díaz-Vélez J., Fiorino D., Westerhoff S.		
<a href="https://doi.org/10.3847/0004-637X/823/1/10">10.3847/0004-637X/823/1/10</a>	<b>The Transport of Cosmic Rays Across Magnetic Fieldlines</b>	July 2014
<b>Desiati P.</b> , Zweibel E.		
<a href="https://doi.org/10.1088/0004-637X/791/1/51">10.1088/0004-637X/791/1/51</a>		

## Research Activities

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**IceCube.** Leading the cosmic-ray analyses in IceCube since 2006. Co-PI of the current IceCube Cosmic Ray Analysis sub-award (funded by NSF; UW–Madison Co-PI: Desiati). I lead a working group on cosmic-ray anisotropy analyses, including Prof. Rasha Abbasi (Loyola University Chicago), Prof. Frank McNally (Mercer University), and Dr. Juan Carlos Díaz Vélez (WIPAC).

**IceCube.** Collaboration with Prof. Julia Becker Tjus (University of Bochum, Germany) and the Bochum group on the observation of the cosmic-ray shadow cast by the Moon and the Sun using IceCube data and on the numerical calculation of cosmic-ray particle trajectories around the Sun at different phases of the solar cycle.

**HAWC.** Combined analysis of 10 TeV cosmic-ray anisotropy with the HAWC and the IceCube neutrino observatories (with Dr. Juan Carlos Díaz Vélez). I am working on an overhaul of cosmic-ray anisotropy analysis in the 1-100 TeV energy range, using eight years of HAWC data. And on the HAWC/IceCube combined analysis in the 10-100 TeV energy range (funded by NSF grant; PI: Desiati). An MoU between IceCube and HAWC was established.

**SWG0.** Collaboration member of the Southern Wide-field Gamma-ray Observatory (SWG0) and member of the Cosmic Ray task force aimed to establish requirements for high-energy cosmic anisotropy observations.

**GRAPES-3.** Collaboration with the GRAPES-3 extensive air shower experiment (located in Ooty, India) aimed to perform a combined analysis of cosmic-ray anisotropy with IceCube in the energy range of 10-100 TeV. An MoU between IceCube and GRAPES-3 was established.

**Numerical Calculations.** Collaboration with Prof. Nikolai Pogorelov (Univ. of Alabama - Huntsville), Prof. Zhang Ming (Florida Institute of Technology), and Dr. Vanessa López Barquero (University of Maryland) on the heliosphere's distortion effects on the arrival direction distribution of TeV cosmic rays and the unfolding of the interstellar diffusion properties.

## Technology

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**NASA.** Collaboration with Prof. Elena D'Onghia (Department of Astronomy, UW–Madison) and Prof. Bryan Bednarz (Department of Medical Physics, UW–Madison) on a feasibility study of an active magnetic shielding technology aimed at protecting astronauts during long-haul space travel and reduce the absorption of space radiation. Recipients of NASA Innovative Advanced Concept (NIAC) Phase I award (2022) to conduct the investigation (Co-PI: Desiati). Collaboration with Prof. John Pfothenauer and Prof. Franklin Miller (Department of Mechanical Engineering, UW–Madison) for the feasibility study and design of the magnetic shield's high-temperature superconducting coil and the mechanical support structure.

**Patent.** The magnetic shielding technology also has potential applications in safeguarding quantum computers from qubit decoherence due to cosmic-ray muons. I received the WARF Draper Technology Innovation Fund (2021-22) to explore this further. Additionally, I am a co-inventor on a patent titled "Radiation Shielding" ([WO2023080934A3](https://patent.google.com/patent/WO2023080934A3), [US20240354624A1](https://patent.google.com/patent/US20240354624A1)), highlighting the significance of this research.