

# Workshop on Machine Learning for Analysis of High-Energy Cosmic Particles



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## AI Agents for Ground-Based Gamma Astronomy (Remote)

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The next generation instruments for ground-based gamma-ray astronomy are marked by a substantial increase in complexity with dozens of telescopes. This leap in scale introduces significant challenges in managing system operations and offline data analysis. The methods, which depend on advanced personnel training and sophisticated software, become increasingly strained as the system's complexity grows, making it more challenging to effectively support users in such a multifaceted environment.

To address these challenges, we propose the development of AI agents based on instruction-finetuned large language models (LLMs). These agents align with specific documentation and codebases, understand the environmental context, operate with external APIs, and communicate with humans in natural language. Leveraging the advanced capabilities of modern LLMs, which can process and retain vast amounts of information, these AI agents offer a transformative approach to system management and data analysis by automating complex tasks and providing intelligent assistance.

We present two prototypes aimed at integrating with the Cherenkov Telescope Array Observatory pipelines for operations and offline data analysis. The first prototype automates data model implementation and maintenance for the Configuration Database of the Array Control and Data Acquisition (ACADA). The second prototype is an open-access code generation application tailored for data analysis based on the Gammapy framework.

### Type of Contribution

talk

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