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Dr. Sai assistant for particle physics based on LLMs

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With the widespread adoption of large language models (LLMs) like ChatGPT, AI has emerged as a transformative productivity tool across human industries. LLM-based agents—capable of autonomous task planning, tool utilization, and result explanation—have consequently become a hot point of recent research.

High-energy physics analysis presents a compelling AI4Science scenario. It features established, AI-adaptable processes like data processing and parsing, yet demands specialized domain knowledge and involves intricate, multi-step workflows.

Building on this, we introduce Dr. Sai, a multi-agent system designed for BESIII high-energy physics experiment analysis. By decomposing complex tasks into manageable subtasks, specialized agent teams collaboratively execute core workflows—including algorithm generation, job script construction/submission, and result visualization.

Currently, Dr. Sai is able to automate physics data pre-processing steps. Future development will prioritize intuitive human-computer interaction and adaptive learning to continuously enhance efficiency in complex scientific research tasks.

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