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Large language models in astrophysics and prospects for applying GigaChat to Baikal-GVD and TAIGA

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We review applications of large language models in astrophysics and astroparticle physics, including literature retrieval, scientific programming, observational data analysis, and computational experiments. We compare three complementary approaches: domain adaptation, retrieval-augmented generation, and agents that use external tools. Building on this comparison, we propose an architecture for a research assistant for Baikal-GVD and TAIGA. Particular attention is given to GigaChat as a promising foundation for a Russian-language scientific assistant. Its Russian-language specialization and the availability of open weights provide opportunities for adaptation to collaboration documentation and deployment within collaboration computing infrastructure. We propose three pilot use cases: extracting information from astronomical alerts, reproducing a selected analysis, and answering questions about technical documentation. We formulate a protocol for domain-specific evaluation using AstroMLab-1 and collaboration tasks. Integration with scientific tools, computational reproducibility, and validation of physical results are discussed as requirements for developing a GigaChat-based assistant.

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