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Magnetic field approximation for the SPD detector

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Accurate knowledge of the magnetic field distribution is essential for precise momentum reconstruction of charged particles in the SPD experiment at NICA. Traditional interpolation of pre-computed field maps becomes computationally expensive for high-resolution grids and may be inaccurate in regions with sparse measurements. A systematic comparative study of machine learning methods for approximating the three-dimensional magnetic field of the SPD detector is presented. The study covers a broad range of approaches, including neural networks and other algorithms. The magnetic field in this work was constructed using Monte Carlo simulation. The results are presented and discussed, with recommendations for choosing a field approximation method depending on the available data and required precision.

Primary author(s) : DMITRY, Fomenok (JINR); VOYTISHIN, Nikolay (JINR); Prof. OSOSKOV, Gennady (JINR)

Presenter(s) : DMITRY, Fomenok (JINR)

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