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Muon g-2/EDM Experiment at J-PARC

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In the anomalous magnetic moment of muons (muon g−2), there was a discrepancy of more than 3σ between the Standard Model prediction and the experimental value measured with an accuracy of 0.54 ppm by Brookhaven National Laboratory (BNL) E821 experiment, and it has long been argued that this might be a sign of new physics beyond the Standard Model. Recently, Fermilab's experimental group improved BNL's experimental equipment and conducted experiments in a similar method. The result is consistent with the previous experiment, and the discrepancy between the average of the two experiments and the Standard Model prediction was updated to 4.2σ. As a result, expectations for new physics discoveries are rising even more. However, since the two experiments employ the same method, it is extremely important to measure with different new methods and confirm the discrepancy. To validate the discrepancy, an experiment with a completely independent approach from the previous two experiments is planned at Japan Proton Accelerator Complex (J-PARC). The J-PARC experiment aims to measure the muon g−2 with a precision of 0.1 ppm and search for muon electric dipole moment with a sensitivity of 1.5×10^{-21} e·cm. The overall design of the experiment and its preparation status will be presented.

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