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MADMAX Data Acquisition and Calibration

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The MADMAX experiment aims to search for dark matter axions in the frequency range 10-100 GHz using a configuration where large thin dielectric disks are stacked in parallel under a strong magnetic field.

When searching for a narrow signal using a large bandwidth, data acquisition plays a critical role. Here we describe a data acquisition system based on a spectrum analyzer. In addition we present the power calibration, and another important component of the experiment where the signal amplification factor (boost factor) is deduced using the bead-pull method [1] in an open booster system.

[1] J. Egge et al., Experimental determination of axion signal power of dish antennas and dielectric haloscopes using the reciprocity approach, JCAP 04 (2024) 005 [arXiv:2311.13359]

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