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Seaching for axions with ADMX: Higher Order Microwave Cavity Modes[1] JAMES SLOAN, University of Washington, ADMX COLLABORATION, ADMX-HF COLLABORATION — The ADMX experiment searches for axions by looking for their resonant conversion to detectable photons with a frequency that directly corresponds to the axion mass (a currently unknown value). Though initial phases of the experiment only collected data at the fundamental frequency of the tunable cavity ADMX now includes all the necessary hardware and electronics to conduct simultaneous axion searches at two frequency regimes. ADMX researchers are investigating the mode structure of the cavity in operation to identify optimal modes and frequency regions for simultaneous data collection at the fundamental frequency mode and at a higher frequency mode. As these structures are understood, strategies of operation will be developed. In addition, in the summer of 2013 smaller high frequency cylindrical cavities were designed, constructed, and tested to allow ADMX to perform searches at higher frequencies than the large volume cavity that is currently installed. The cavities are essentially the same geometry as the current ADMX cavity scaled down, and an adapter plate to attach the cavities to the current hardware was also built to simplify integration in the current system and allow a quick move to a higher frequency search.

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