**MT29 Abstracts and Technical Program** 



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## Thu-Mo-Po.01-03: Magnetic field analysis and shielding of components for the Material Plasma Exposure Experiment

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The magnet system for the Material Plasma Exposure eXperiment (MPEX) provides the necessary field profile to enable rf source and heating along the length in order to meet the desired key performance parameters (KPPs) at the target area. In addition to the magnet system, MPEX has other systems (vacuum, diagnostics, rf source and heating) that operate in close proximity and require shielding solutions that have to be optimized with respect to location and their potential impact on magnet operation. Several magnetic or magnetically sensitive components near the magnets have been analyzed including structural steel beams used to support the high-efficiency particulate air (HEPA) filter system, motors located on the helicon and ion-cyclotron heating (ICH) plasma heating boxes, the Target Exchange Cart (TEC), external magnet mounting and alignment rails, the electron-cyclotron heating (ECH) gyrotron, and the Surface Analysis Station (SAS) which includes a field-sensitive mass spectrometer. Using finite element modeling, the impact on each component is assessed and shielding solutions presented for each component. Verification of performance in a local magnet test stand was carried out to validate modeling and confirm the ability of the component to operate in a limited number of cases.

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