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Phase Foldings of Poloidal Magnetic Signals in Tokamak Plasmas[1] J.-S. KIM, D.H. EDGELL, FARTECH, Inc., M.S. CHANCE, PPPL, J.M. GREENE, E.J. STRAIT, A.D. TURNBULL, GA — Tokamak poloidal magnetic signals are known to exhibit phase folding, or phase reversal. The n=1 components of high beta DIII-D discharges have routinely shown strong phase foldings, up to 2π in phase, over the entire inboard region of the plasma. This seemingly paradoxical phenomena can be explained via superposition of poloidal harmonic components of rotating helical modes. Strong phase foldings are due to poloidal modulation to the amplitude of each helical component, which induce apparent "opposite" helicity components at the measurement location. The sources of poloidal modulation include toroidicity, plasma shaping, change in measurement orientations, and non-uniform distances between the signal source and the measurement locations. Weak phase foldings of poloidal Mirnov array signals can occur from multiple helical components of constant amplitudes. Thus, phase foldings can even occur in circular cylindrical tokamaks. The strong phase foldings observed in a high beta DIII-D tokamak plasmas are verified via numerically predicted kink-type ballooning structure.

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☐ Prefer Oral Session
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