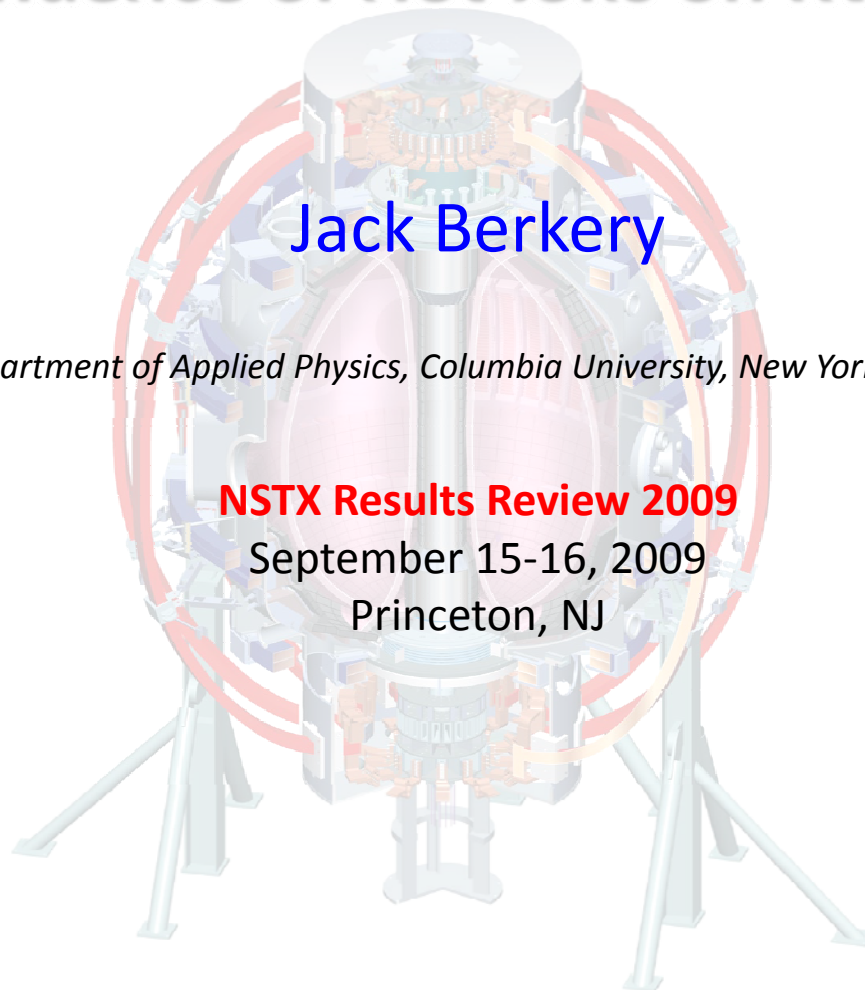


# XP932: Influence of Hot Ions on RWM Stability

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 Colorado Sch Mines  
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 General Atomics  
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 U Wisconsin



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**NSTX Results Review 2009**

September 15-16, 2009

Princeton, NJ

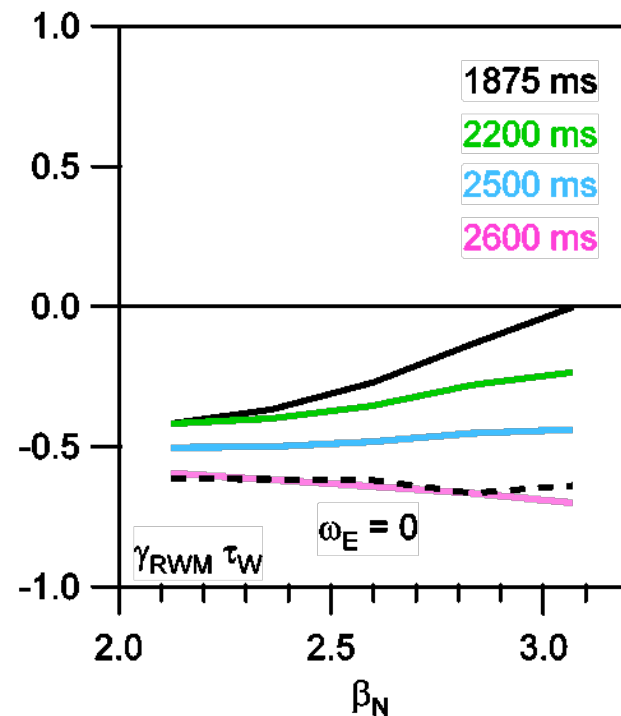
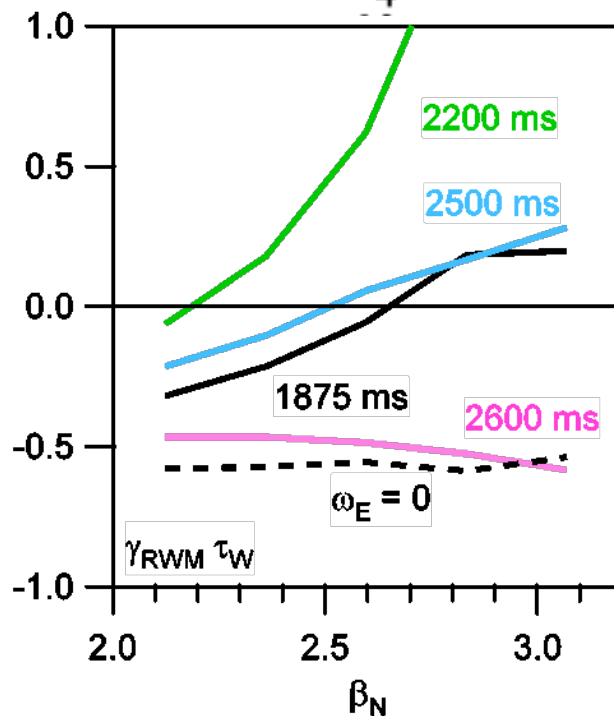
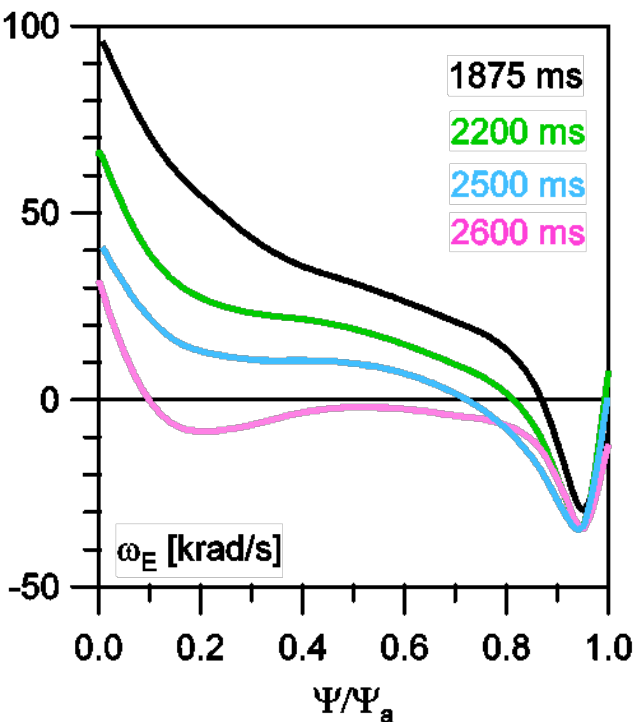
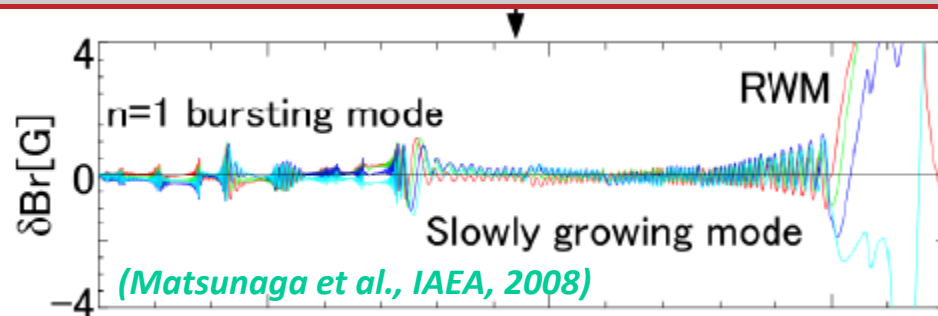
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 Ioffe Inst  
 RRC Kurchatov Inst  
 TRINITY  
 KBSI  
 KAIST  
 POSTECH  
 ASIPP  
 ENEA, Frascati  
 CEA, Cadarache  
 IPP, Jülich  
 IPP, Garching  
 ASCR, Czech Rep  
 U Quebec

# Overview

- **XP932 Goal:**
  - Test the influence of energetic particles in stabilizing the RWM in NSTX by varying plasma current and field, and beam voltage.
- **Supports:**
  - MDC-2: Joint experiments on resistive wall mode physics
  - NSTX Research Milestone R(09-1): Understand the physics of RWM stabilization and control as a function of rotation.
  - 2009 APS Invited Talk
- **Accomplished:**
  - ~2.5 days of run time (spread over 5/13, 5/14, 5/15, 5/27, 7/23)

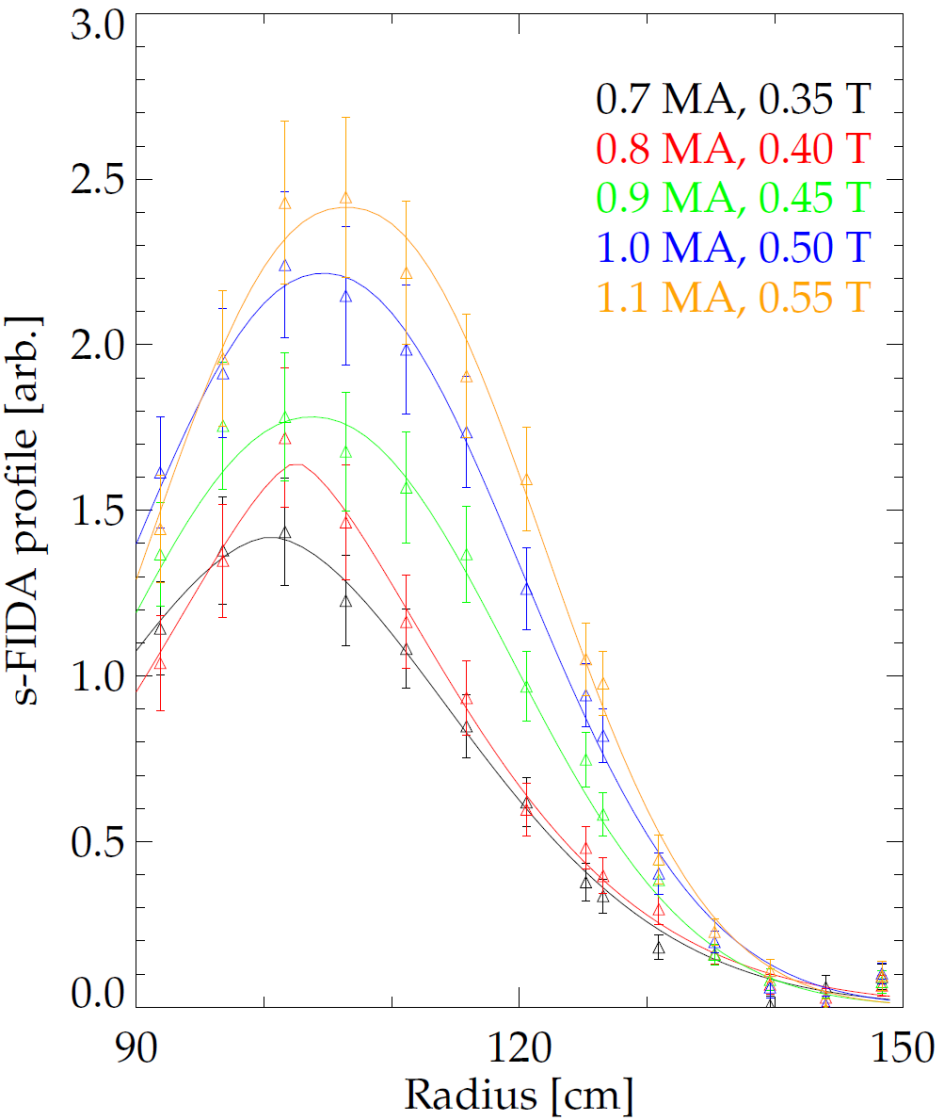
# Motivated by observations of RWM triggers and kinetic analysis

Recent JT-60U results suggest changes in energetic particle distribution could be related to RWM destabilization.



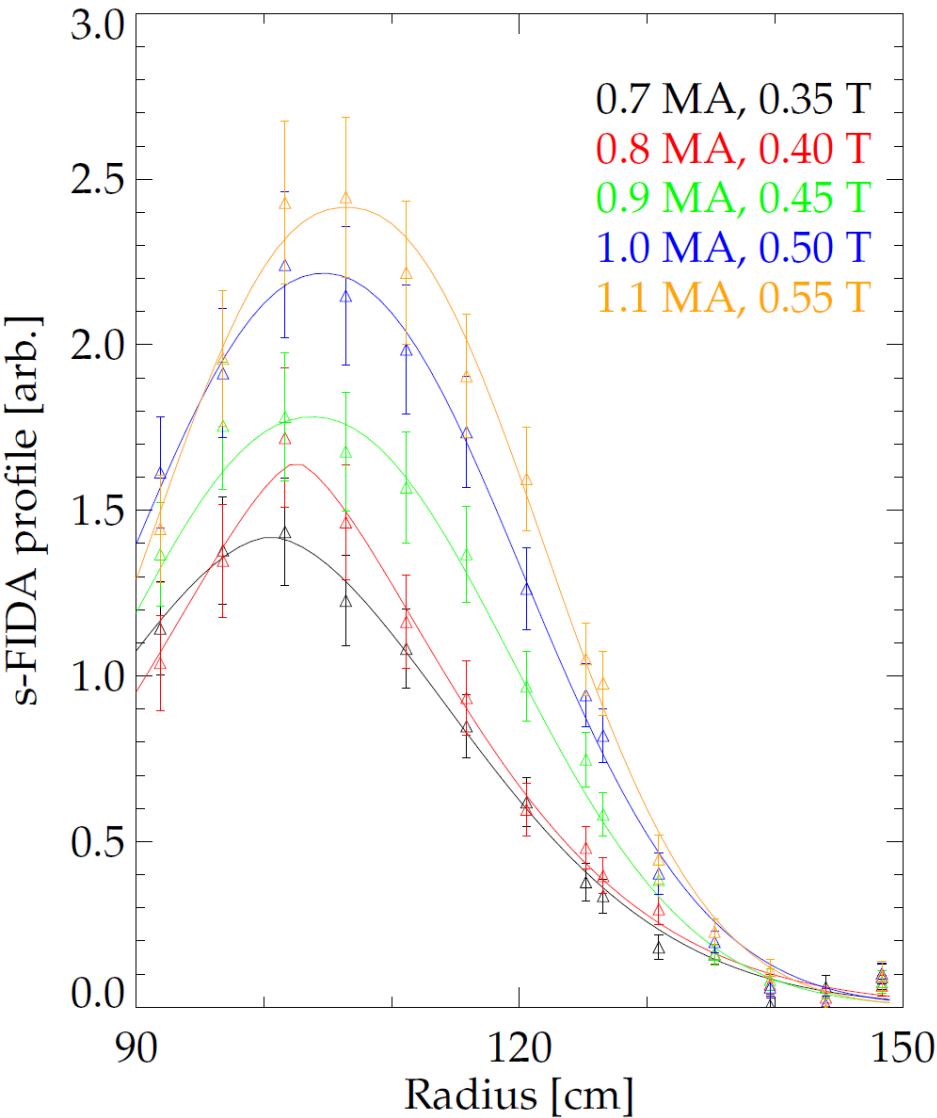
For DIII-D shot 125701, MISK predicts a band of instability at moderate rotation without hot ions, but complete stability with hot ions.

# Energetic particle content is decreased with decreased $I_p$ , $B_t$

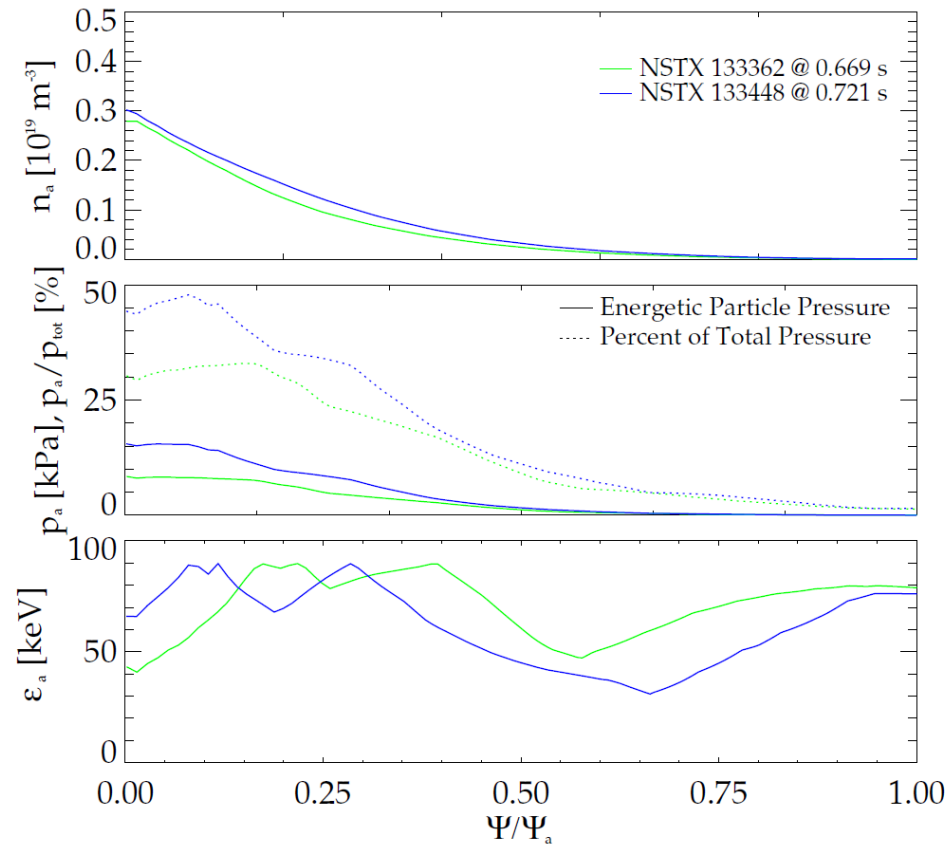


- FIDA results are as expected

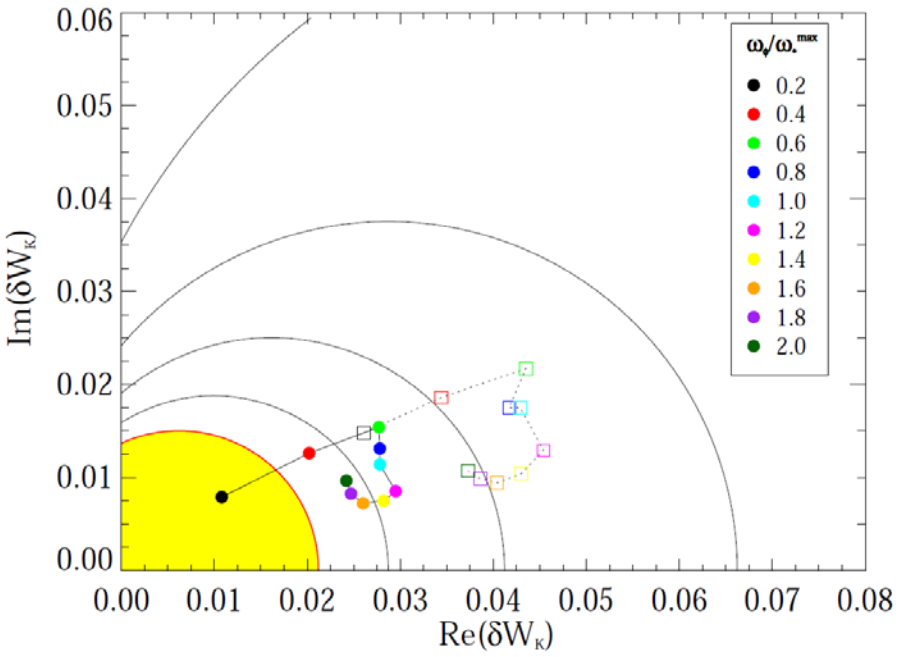
# Energetic particle content is increased with increased $I_p$ , $B_t$



- FIDA results are as expected
- TRANSP shows smaller difference in density, but significant difference in  $p_a/p_{tot}$ .

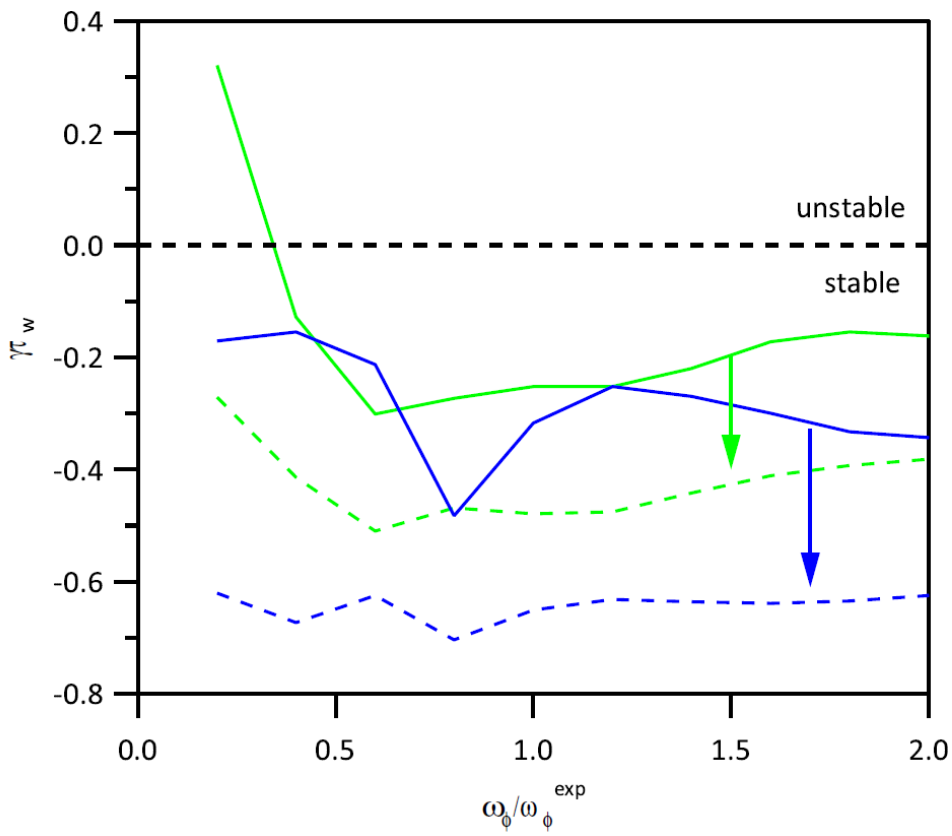
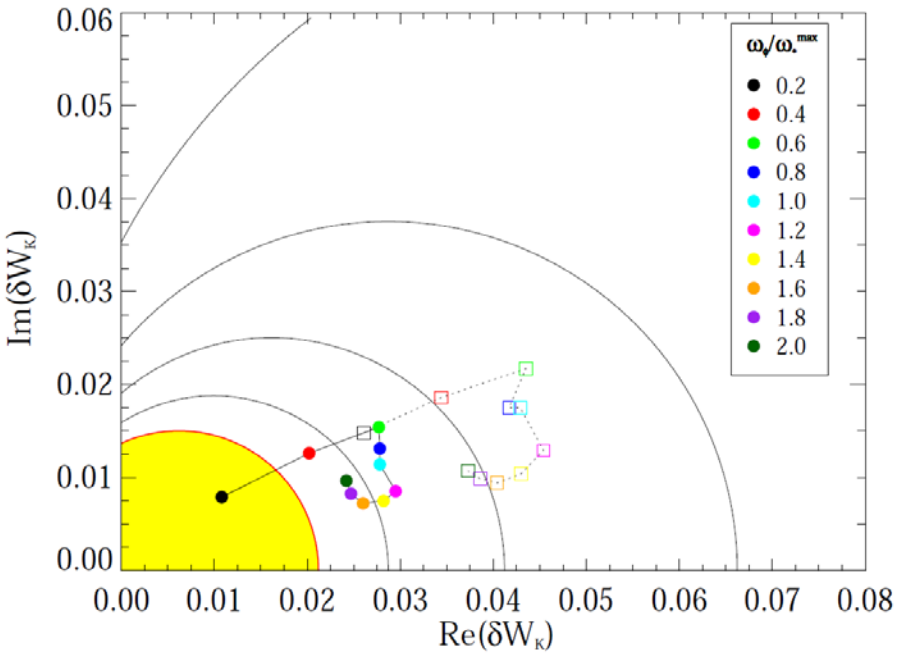


# MISK analysis shows the importance of energetic particles in RWM kinetic stability theory



- MISK seems to overpredict stability in general, and even more so with energetic particles included.

# MISK analysis shows the importance of energetic particles in RWM kinetic stability theory



- MISK seems to overpredict stability in general, and even more so with energetic particles included.
- The analysis shows a larger stabilizing effect for the shot with the larger energetic particle pressure fraction.

XXX