NSTX-U

Supported by

U.S. DEPARTMENT OF ENERGY | Office of Science

Massive Gas Injection Studies on NSTX-U

College W&M
Colorado Sch Mines
Columbia U
Comp-X
General Atomics
INL
Johns Hopkins U
LANL
LLNL
Lodestar
MIT
Nova Photonics
New York U
Old Dominion U
ORNL
PPPL
PSI
Princeton U
Purdue U
SNL
Think Tank, Inc.
UC Davis
UC Irvine
UCLA
UCSD
U Colorado
U Maryland
U Rochester
U Washington
U Wisconsin

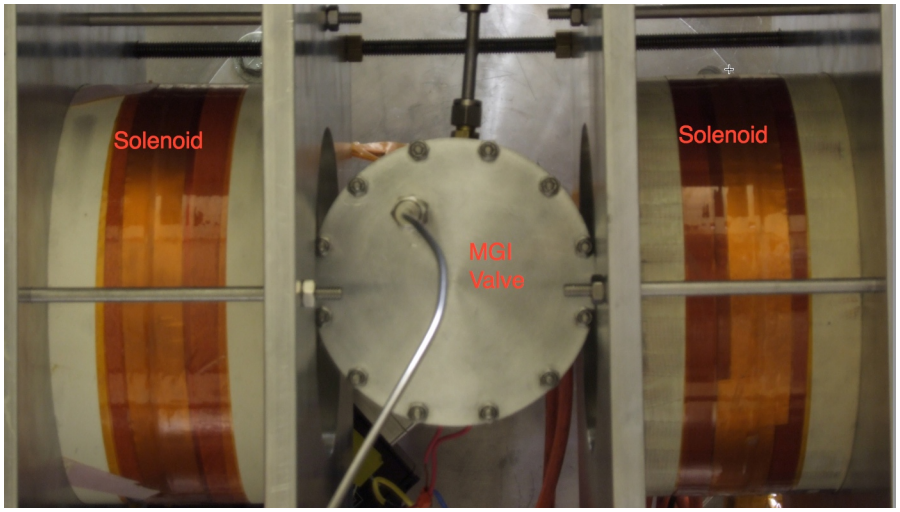
[1]R. Raman, [2]S.P Gerhardt, and others
[1]University of Washington
[2]Princeton Plasma Physics Laboratory

This work is supported by US DOE contract numbers
FG03-96ER5436, DE-FG02-99ER54519 and DE-AC02-09CH11466

NSTX-U Research Forum
PPPL, Princeton, NJ, February 24-27, 2015

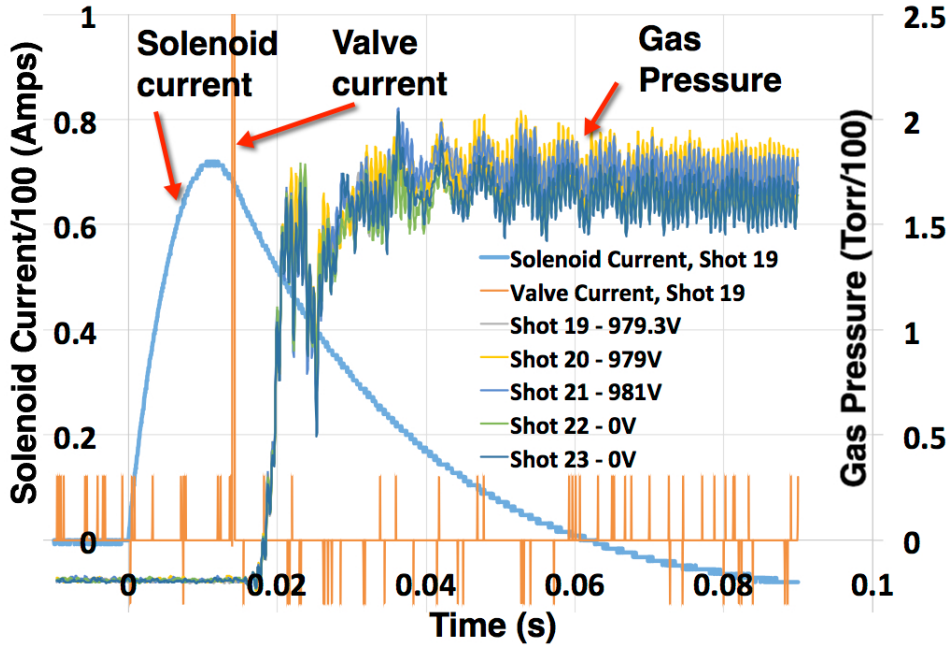
Culham Sci Ctr
U St. Andrews
York U
Chubu U
Fukui U
Hiroshima U
Hyogo U
Kyoto U
Kyushu U
Kyushu Tokai U
NIFS
Niigata U
U Tokyo
JAEA
Hebrew U
Ioffe Inst
RRC Kurchatov Inst
TRINITI
KBSI
KAIST
POSTECH
ASIPP
ENEA, Frascati
CEA, Cadarache
IPP, Jülich
IPP, Garching
ASCR, Czech Rep
U Quebec

Electromagnetic MGI Valves to Support NSTX-U Disruption Mitigations Studies Build & Tested



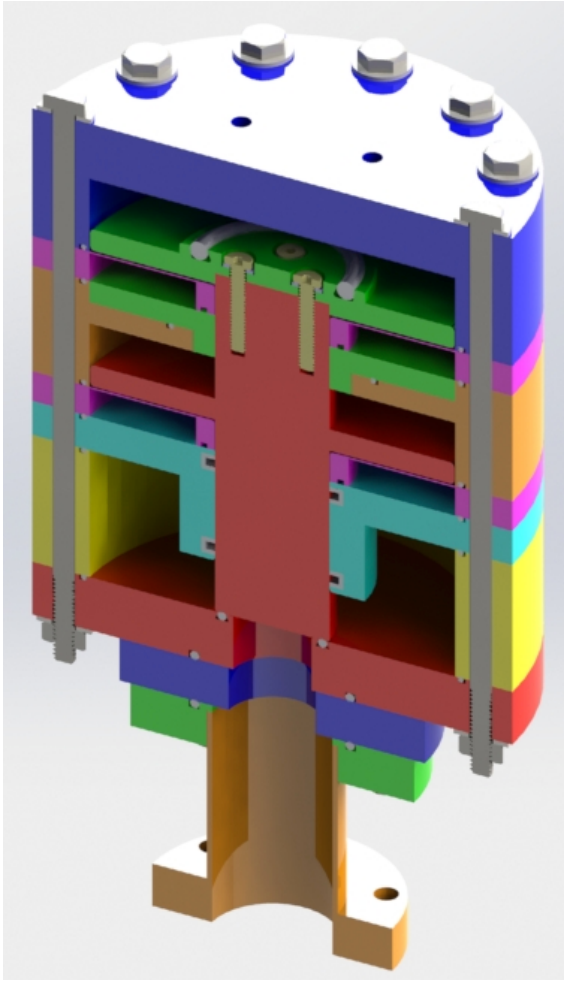
Solenoid driven using a 10 mF, 1kV Capacitor bank

Field between the two coils is 1.8T at 2kA coil current

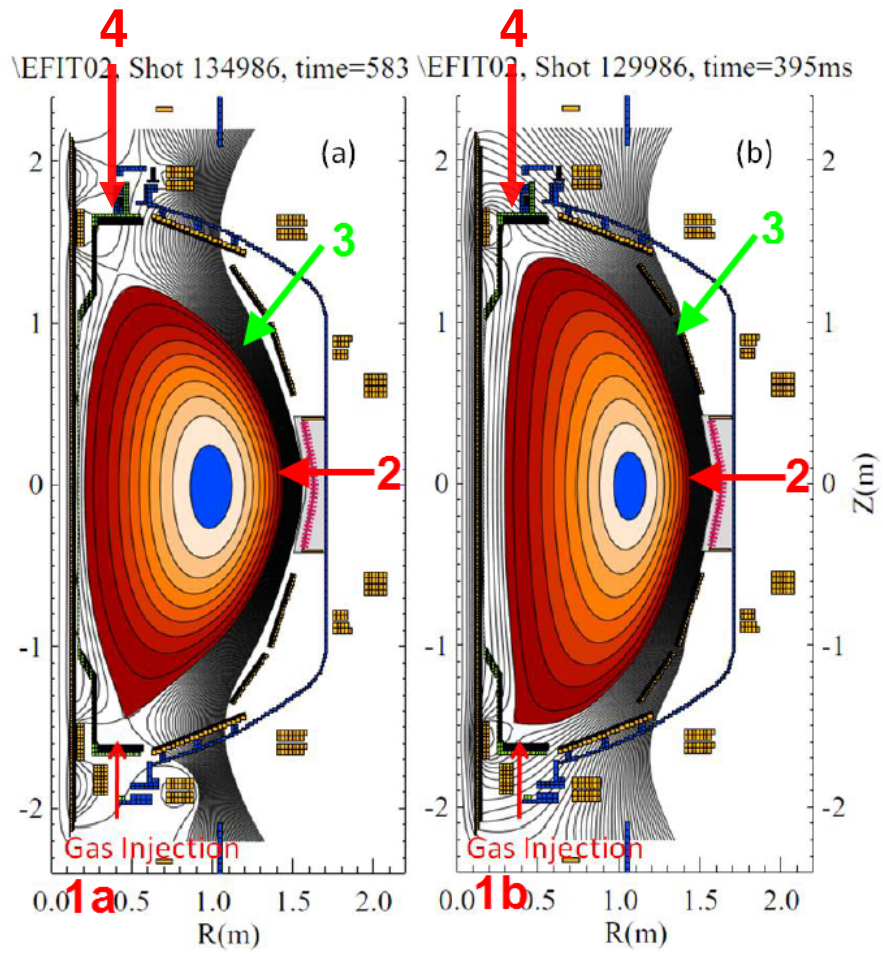


V2 valve has two solenoids, with currents driven in opposite direction (based on ORNL ITER MGI Test Valve design)

V2- NSTX-U MGI Valve



FY15 NSTX-U MGI experiments will use three MGI valves at different poloidal locations



Low triangularity High triangularity

- This XP Plan
  - Operate valves at ~5000 Torr (200 Torr.L Neon) [Increase to 10,000 Torr if NSTX-U limits can be increased]
  - Compare mid-plane and PFR locations for gas assimilations studies using identical gas injection set-up
  - Measure radiated power profiles, divertor heat loads and currents in divertor tiles, and compare to unmitigated discharges
  - Use DN or LSN & USN discharges at low and high triangularity
  - Run Time: 2 days

1a: Private flux region 1b: lower SOL

2: Conventional mid-plane injection

3: Variation in poloidal location

4: Injection from the upper divertor region