



U.S. DEPARTMENT OF  
**ENERGY**

Office of  
Science



# USING GLOBUS TRANSFER FOR CAMERA DATA ON NSTX-U\*

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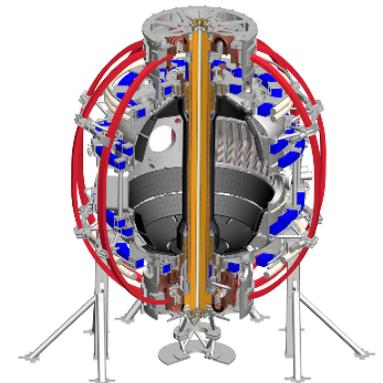
Lawrence Livermore National Laboratory

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# NSTX-U, PPPL

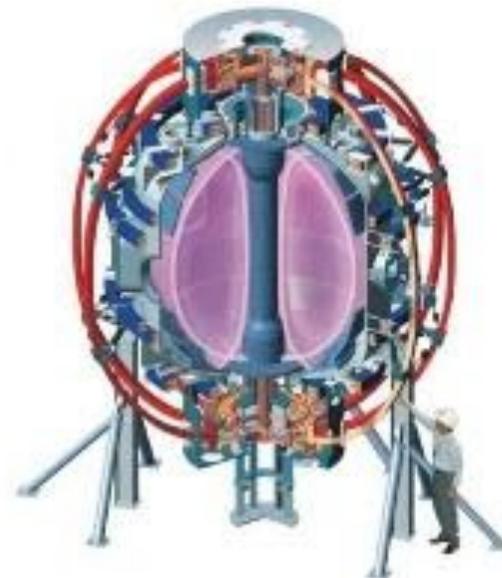
- National Spherical Torus Experiment-Upgrade

([nstxu.pppl.gov](http://nstxu.pppl.gov))  NSTX-U

- Princeton University Plasma Physics Laboratory

([www.pppl.gov](http://www.pppl.gov))  PPPL

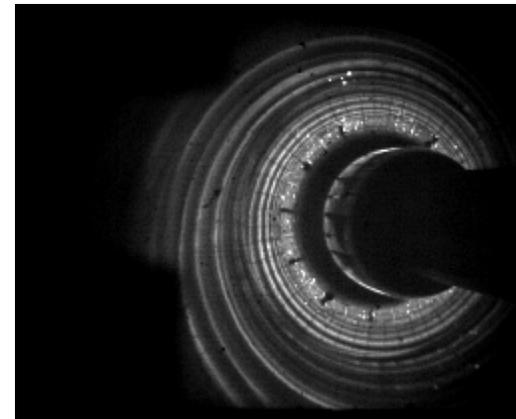
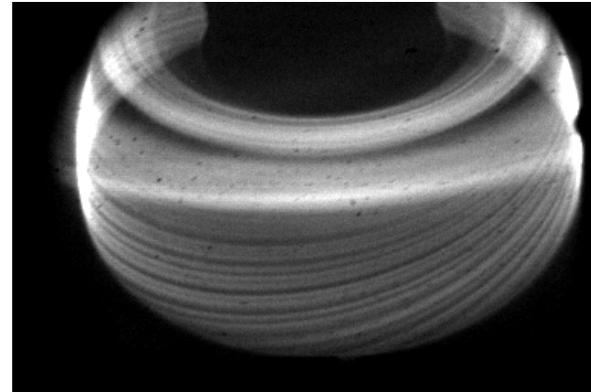
Princeton, NJ



# The NSTX-U Cameras

## – Fast video cameras, one of many diagnostics

- Record the plasma light at different locations during experiments
- Frame rate up to 500,000 frames per second
- Camera data files written to the local disk on Win7 PCs
- Size is typically 3 GB, but can be as large as 10 GB
- Need to be transferred to linux cluster storage after each experimental pulse throughout the NSTX-U run day, ~25 pulses per day



# Data Transfer Method

- Traditionally, transferring the camera data to project storage located in the main computer center has been accomplished by using the Samba protocol
- Recently, a new method has been implemented using Globus Connect Personal and the Globus Command Line Interface (CLI)
- Automatic, no user interaction required
- Programming language: National Instruments' LabVIEW

# The File Transfer Task

- CLI **transfer** command to initiate the transfer and return the Task ID:
  - `transfer --no-verify-checksum --`  
`camuser#nstxfocam06/e/2016/nstx_6_204202.cin`  
`pppl#pppl-globus1/p/nstxcam/Phantom710-9206/2016/nstx_6_204202.cin`
- CLI **wait** command with the Task ID to signal transfer completion
  - `Wait cf901450-fdcb-11e5-a704-22000bf2d559`
- CLI **events** command to return the transfer details
  - `events -f 'details' cf901450-fdcb-11e5-a704-22000bf2d559`
- CLI **endpoint-details** command to return the status: active / expired
  - `endpoint-details -f 'credential_status' pppl#pppl-globus1`

# Globus transfer details

- Wrap Up
  - uses PuTTY and the PuTTY tools to handle the SSH authentication between the local host and the Globus online services
  - When the LabVIEW VI is launched
    - checks that PuTTY Pageant is running
    - if the endpoint is expired, it launches a PuTTY session configured to execute the CLI command to activate the endpoint
  - Sends user a daily email with endpoint status
  - Globus transfer method has increased the transfer of camera data files by a factor of 3

# Labview Front Panel

Main for focam08.vi

File Edit Operate Tools Window Help

**NSTX-U**

STOP VI

NSTX-FOCAM08 Phantom1211-16611

Today is: Friday, April 08, 2016

Current User: camuser

Shot Number Control

Synchronous w/ NSTX Shot

NSTX Shot Number: 204202

Before / In Between Cycle

Shot Number Incremented Abort Cycle

Detected Cine File

File for this Shot: nstx\_8\_204202.cin

Size of cine: 7867 MB

Waiting for data to complete

Tranferring Cine File to portal

Elapsed Time (00:00): 01:39

Data Directory: F:\temp

Disk Space: 29993.6 MB

Portal Data Directory: /p/nstxcam/Phantom1211-16611/2015

Endpoint Status

```
Welcome to globusonline.org, camuser. Type 'help' for help.
$ Credential Status: ACTIVE
$
```

Transfer Details

```
Details: {
  "type": "GridFTP Transfer",
  "concurrency": 2,
  "parallelism": 4
}
Details: {
  "bytes_transferred": 7867308840,
  "mbps": 666.27,
  "duration": 94.46
}
Details: {
  "files_succeeded": 1
}
$
```

Transfer Cmd Err out

Wait Command Out

```
1/1 648.85 mbps
$
```

CamPCNum: 08

endpoint: nstx-focam08

Transfer Command

```
transfer --no-verify-checksum -- camuser#nstx-focam08/f/temp/nstx_8_204202.cin ppp1#pppl-globus1/p/nstxcam/Phantom1211-16611/2015/nstx_8_204202.cin
```

# Block Diagram

