

Omega-60

EXAMPLE

Proposed campaign name: DualMetalXAFS

Principal Investigator (PI):

- D.A. Chin, P.M. Nilson, D.N. Polsin, J.R. Rygg, G.W. Collins – University of Rochester

Collaborators:

- F. Coppari, A. Coleman, Y. Ping – Lawrence Livermore National Laboratory
- M. Harmand, A. Amouretti – Sorbonne University
- R. Torchio – European Synchrotron Radiation Facility

Purpose / goal:

- Perform simultaneous X-Ray Absorption Fine Structure (XAFS) spectroscopy of both the Fe and Ni K-edges of compressed FeNi to constrain the extraction of temperature

Relevance for NNSA missions:

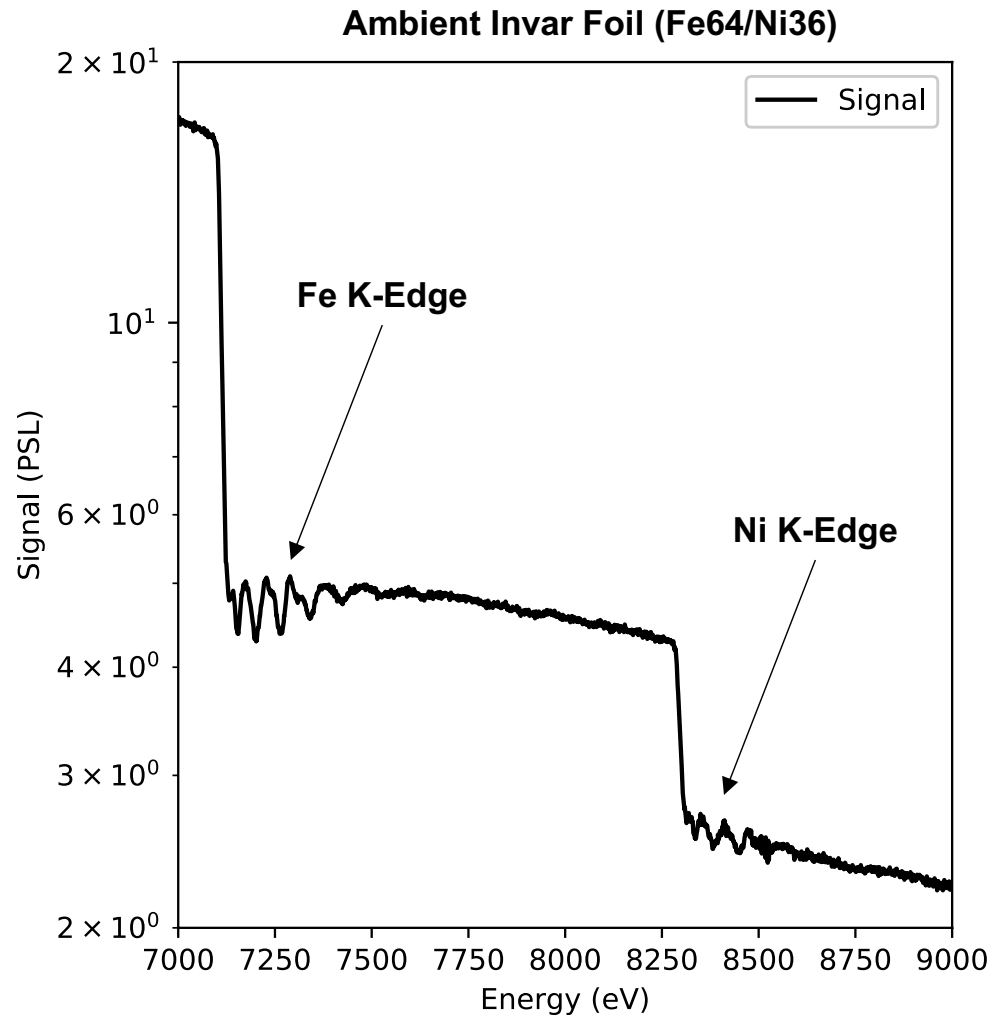
- Continue the development of high-throughput and high-resolution x-ray spectroscopy for XAFS measurements on OMEGA-60
- Advance our experimental and theoretical capabilities for estimating the temperature of compressed materials by performing simultaneous fits of multiple absorption edges

Technical issues (e.g. target design/fab, diagnostics, reconfiguration, etc.):

- None

Proposed campaign name: DualMetalXAFS

Motivation

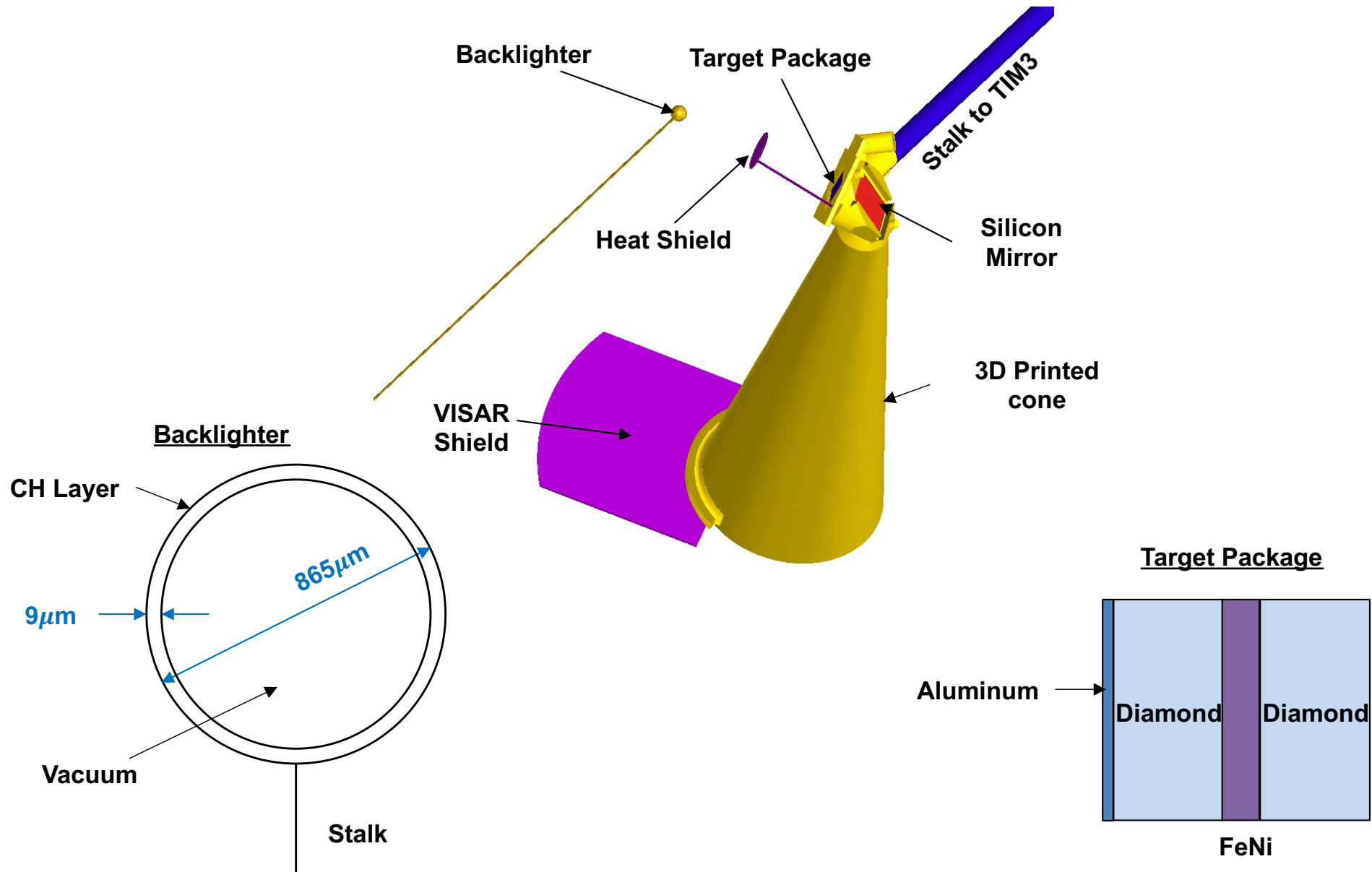


- Adjusting the iron-nickel ratio will allow us to increase the Ni XAFS modulations
- This work will be combined with XRD to study high pressure phase transitions and solid—liquid melt

Fitting of both the Fe and Ni K-edges of the FeNi alloy will help constrain the EXAFS temperature extraction

Proposed campaign name: DualMetalXAFS

VISRAD model configuration or schematic for the proposed experiments



Proposed campaign name: DualMetalXAFS

Experimental configuration

Number of shots or days requested: 2

Schedule request (by quarter, FY21): Q2, and Q3

Facility (OMEGA or EP or Joint): OMEGA

Beam configuration:

- 55 Beams – 50 spherical target compression and 5 planar drive
- 50 SG5-650 DPPs and 5 SG8-FLAT DPPs
- P6-P7 experimental axis

Primary diagnostics: EFX1, EFX2 and VISAR

Targets: CH shells

EXAFS Target Package

- 3D printed cone (Similar to MOEXAFS-20B, MOEXAFS-21A)
- Heat and VISAR shields (Aluminum + Mylar)
- FeNi coating by Gryphon + Invar foil from Goodfellow
- Diamond
- Si mirror

Targets contain Z>36 material? Yes – Pointing target

Spectrometer in use? Yes – Not on pointing shot

Omega-EP EXAMPLE

Proposed campaign name: DACXRD-EP-22A

Principal Investigator (PI) / Collaborators:

M. K. Ginnane, G. Tabak, R. Dias, J.R. Rygg, G.W. Collins

Purpose / goal:

- Develop DAC+PXRDIIP platform.
- Measure evolution of complex structures in dynamically compressed materials that benefit from inert atmosphere or pre-compressed environments.

Relevance for NNSA missions or LLE HED cooperative agreement:

Combining the DAC and PXRDIIP platforms will newly enable diffraction studies on new HED-relevant and surrogate materials. Glueless interfaces between sample and window materials will enrich optical studies of HED matter.

The high scattering and interesting high-pressure phase transitions of calcium make it a good candidate for this platform development day.

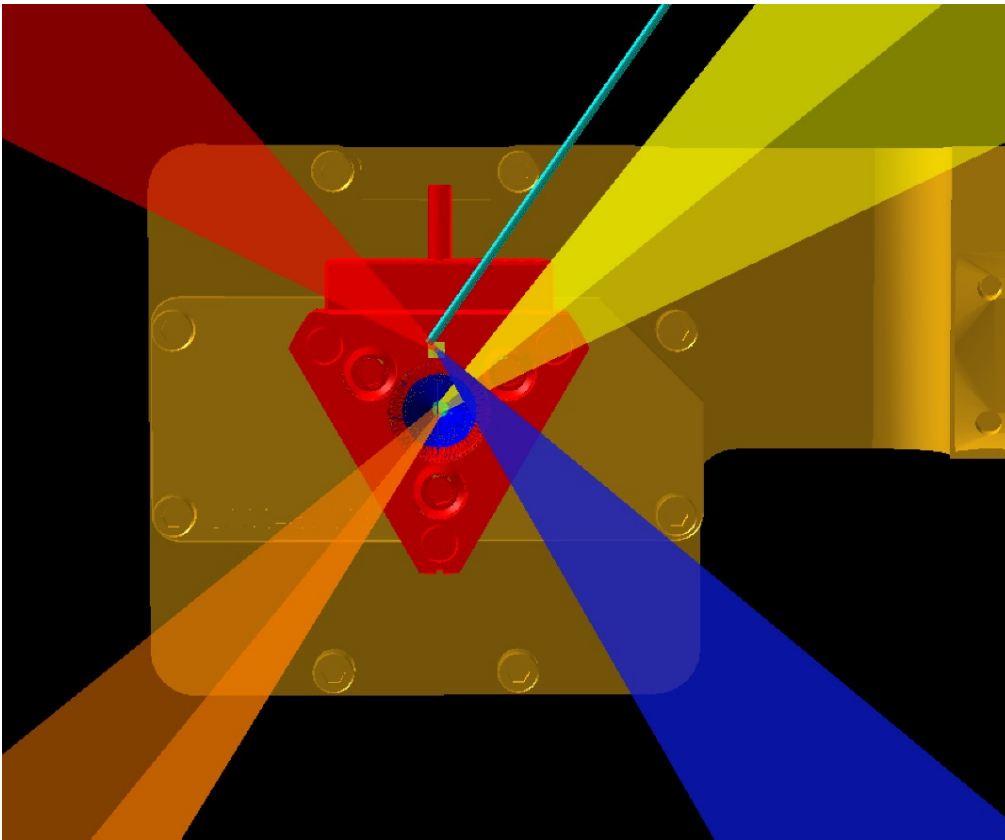
Technical issues (e.g. target design/fab, diagnostics, reconfiguration, etc.):

- Engineering development required for modified PXRDIIP front plate to integrate DAC

Proposed campaign name: DACXRD-EP-22A

VISRAD model configuration or schematic for the proposed experiments

Experimental Configuration



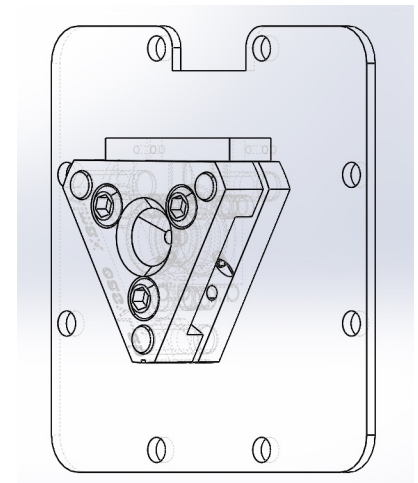
- modified PXRDIP with new front plate design to hold DAC target
- 4 beam UV

Required Diagnostics:

Diagnostic	TIM	Notes
VISAR	12	measures particle velocity to infer pressure
PXRDIP	14	measures diffraction from the sample
XRS3	13	optional; measures the signal of the x-ray source

Engineering Development:

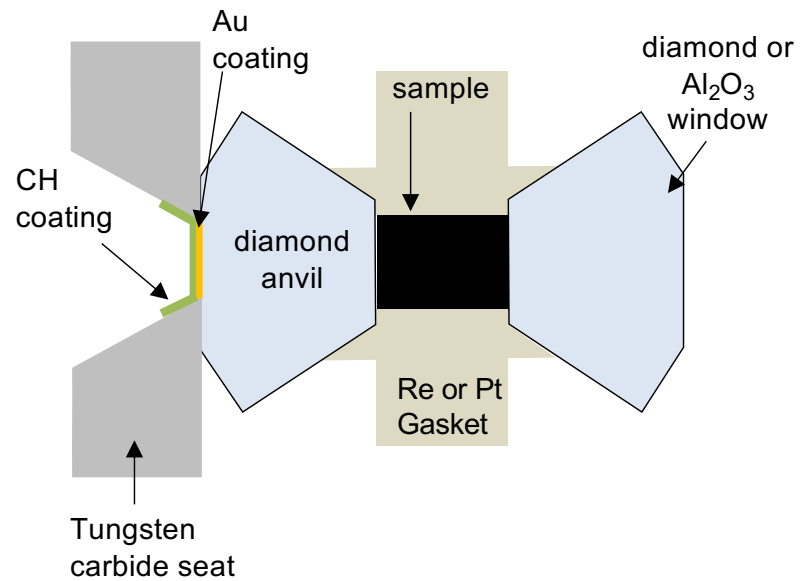
- This campaign will require fabrication of a modified front plate for the PXRDIP platform.



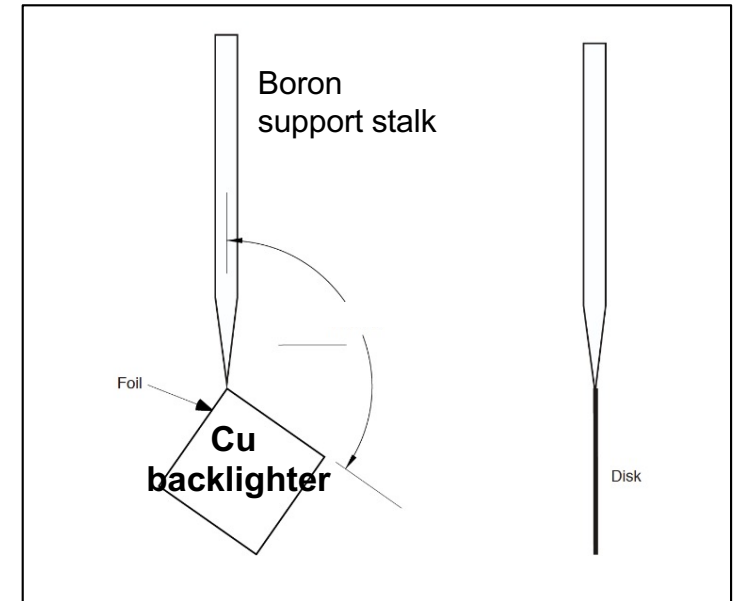
Proposed campaign name: DACXRD-EP-22A

Target Details

DAC targets: x12



Backlighter: x12



Proposed campaign name: DACXRD-EP-22A

Experimental configuration

Number of shots or days requested: 1

Schedule request (by quarter, FY21): Q3, and/or Q4

(If PI could be ready for shots in Q1, please specify.)

Facility (OMEGA or EP or Joint): EP

Beam configuration: 4 beam UV, 750um DPP (x2)

*OMEGA 60: Number of beams, Number and Type of DPPs, 2w/3w/4w probe beam (if required), and experiment axis
OMEGA EP: Required mode for each beam (SP, SP CoProp, UV, or T-OPA)*

Primary diagnostics: VISAR/SOP, PXRDI, XRS

List all required diagnostics (fixed or TIM-based)

Targets: DAC targets (previous slide), Cu foils

DT or DD, Special Fills, Planar Cryo

For EP, all components not expected to survive the shot, driven or otherwise, must be identified including scale, to determine if the OAP dds will be required

Targets contain Z>36 material? (Yes/No) Yes

Spectrometer in use? (Yes/No) Yes