

Esben Klinkby, DTU Physics

# WP6

# Advanced reflector

## WP6: overview

The work in WP6 revolves around the design, manufacturing and testing of a mock-up beam extraction using one (or more) of candidate materials - likely nanodiamonds.

The WP runs M0-M36, coinciding with the PhD student, who is foreseen to be the main workhorse - Please welcome Nicola Rizzi


The work is lead by DTU, with contributions from: Mirrortron(M12+) and ESS.

Total load: 36 person months

## WP6: Deliverables

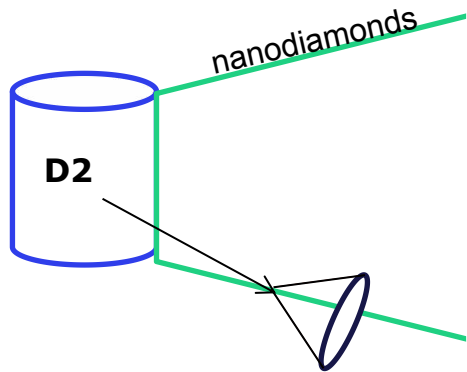
| Deliverable | Description   | Deadline |
|-------------|---|----------|
| D6.1        | Validated McStas implementation of nanodiamond scattering   | M12      |
| D6.2        | Neutronics design of the ESS beam extraction system and for experimental test.  | M33      |
| D6.3        | Publication on results of the experimental campaign of in-pile beam extraction and final activity report, summarizing the entire work package | M36      |

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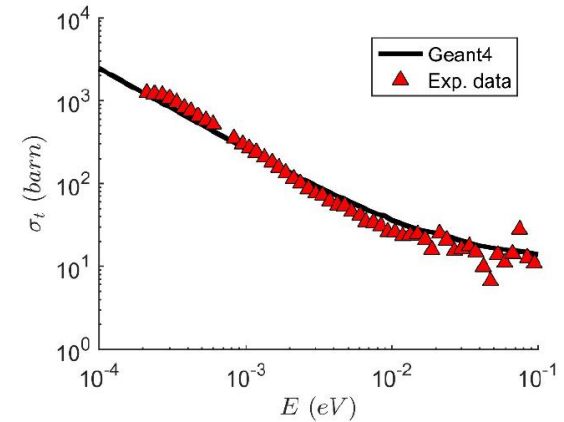


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# Code development status

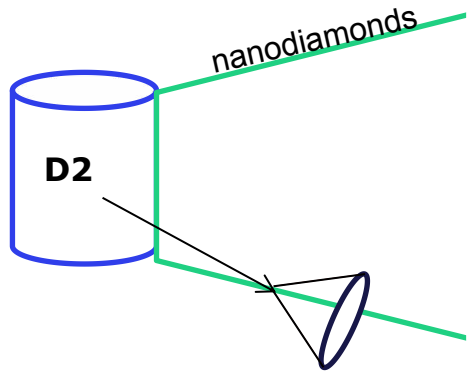


**PRELIMINARY**

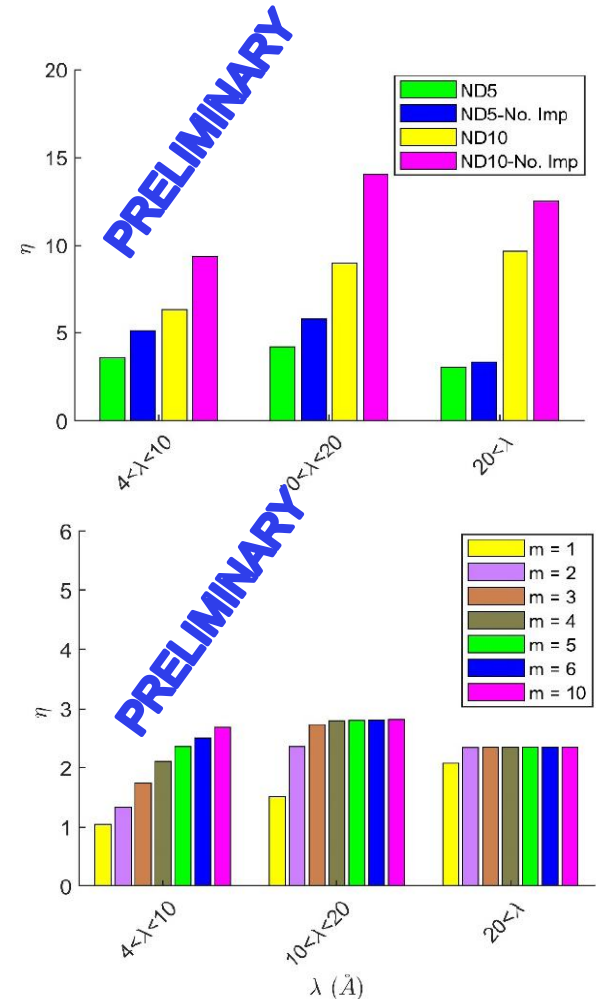


- Preliminary measurements show promising quasispecular interactions of cold neutrons on nanodiamonds - one of several materials to be studied for use in beam extraction
- Exploit for beam extraction, allow divergent neutrons a second chance
- Exploit: ongoing work with M. Jamalipour and L.Zanini  
 : Pre-existing OpenMC implementation by J.I.M. Damian  
 Special attention to effect of impurities (literature + simulations)

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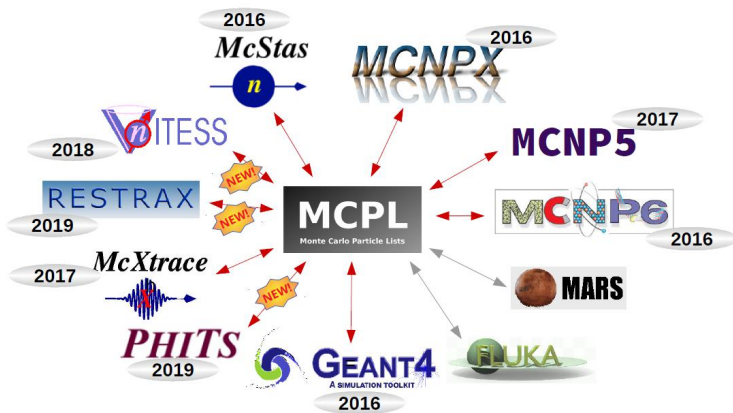
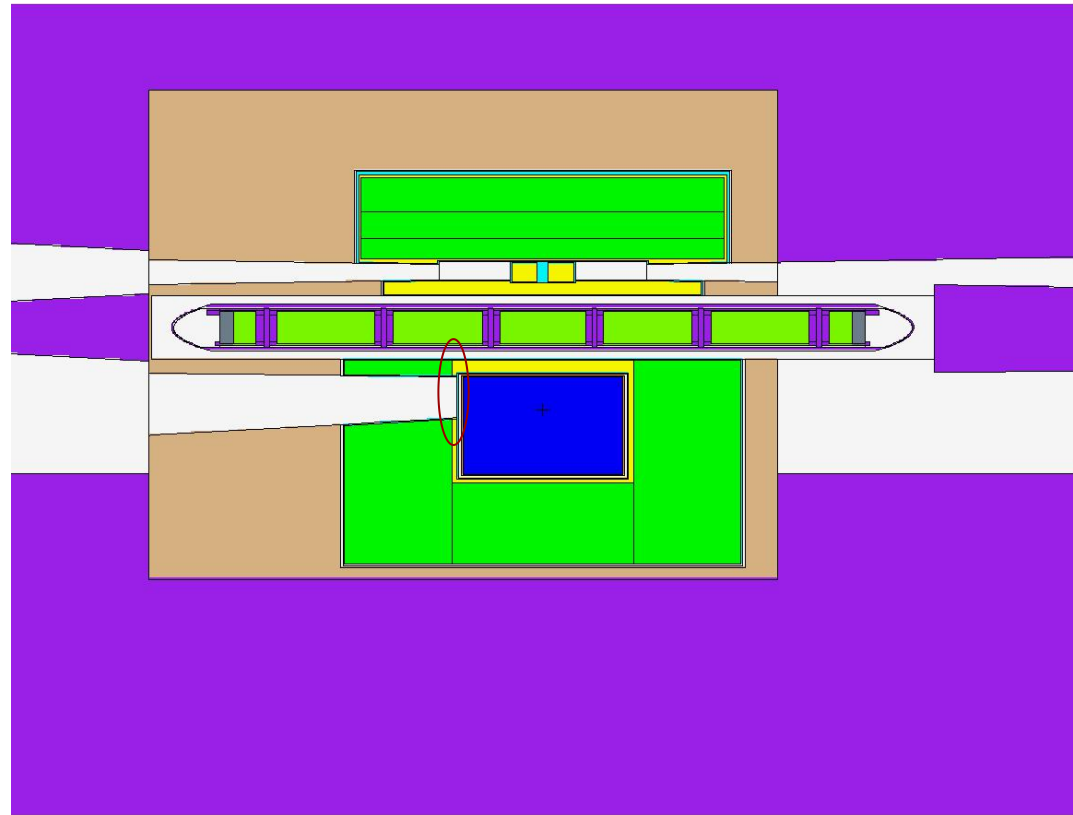


- $<4\text{\AA}$  : supermirrors are superior to nanodiamonds, but  $>4\text{\AA}$  roles may change
- Technical realization not even in concept phase. HighNESS should mature tech



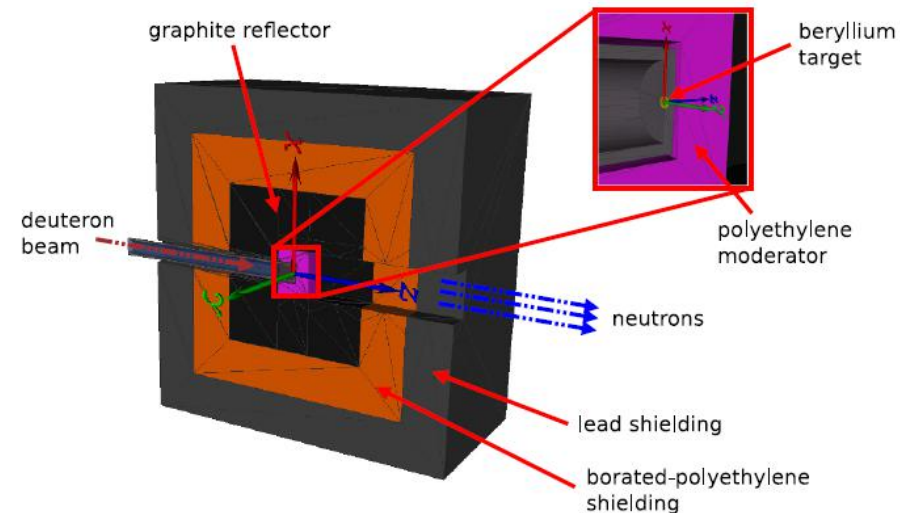
# Code development status: collaboration between work packages

- Baseline model already created in WP4!
- Simulations running to prepare baseline McStas instrument for WP7 via MCPL: individual neutrons ported.
- No exotic materials. Yet.



## Experimental access

- In the proposal, LENS (Indiana) was identified as a possible venue for mock-up experiment
- Likely, this will not be possible
- Other options are presently being considered:
  - Lund University Neutron Source. Accelerator driven, local, flexible, low flux.
  - ILL beamline
- Next step: meeting with Lund Uni
- Before deciding, we'll need to model the experiment and run simulations





# Conclusions

- **Work ongoing on both modeling and towards planing the experiments**
- **Baseline model from WP4 gives the framework needed for progress**
- **Frequent meetings, in partular with WP6, WP2, WP7 ensures progress and alignment**