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Sandia National Laboratories

Time-resolved measurements with preheat shield to reach higher-density

PRESENTED BY

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U.S. DEPARTMENT OF ENERGY | NNSA

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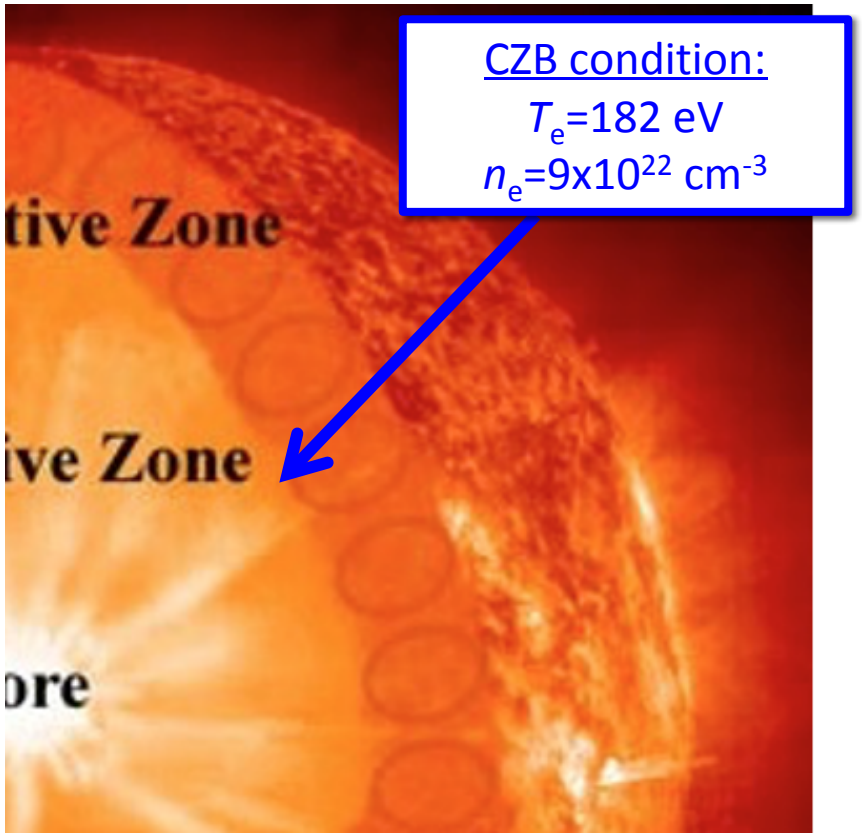
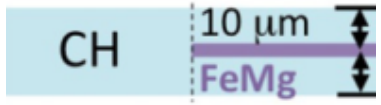
We have measured iron opacity at solar convection-zone-base temperature, but density is still 2-3x lower



CZB condition:
T_e=182 eV
n_e=9x10^{22} cm^{-3}

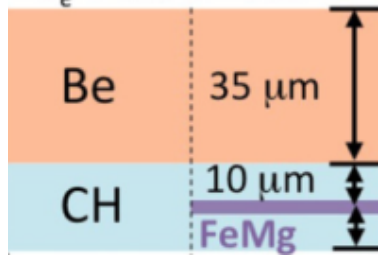
Anchor1

Thin CH:
T_e=167 eV,
n_e=7.1x10^{21} cm^{-3}



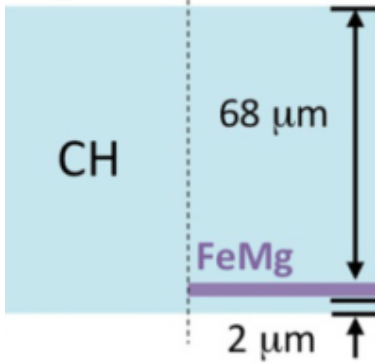
Anchor2

CH+Be:
T_e=182 eV
n_e=3.1x10^{22} cm^{-3}



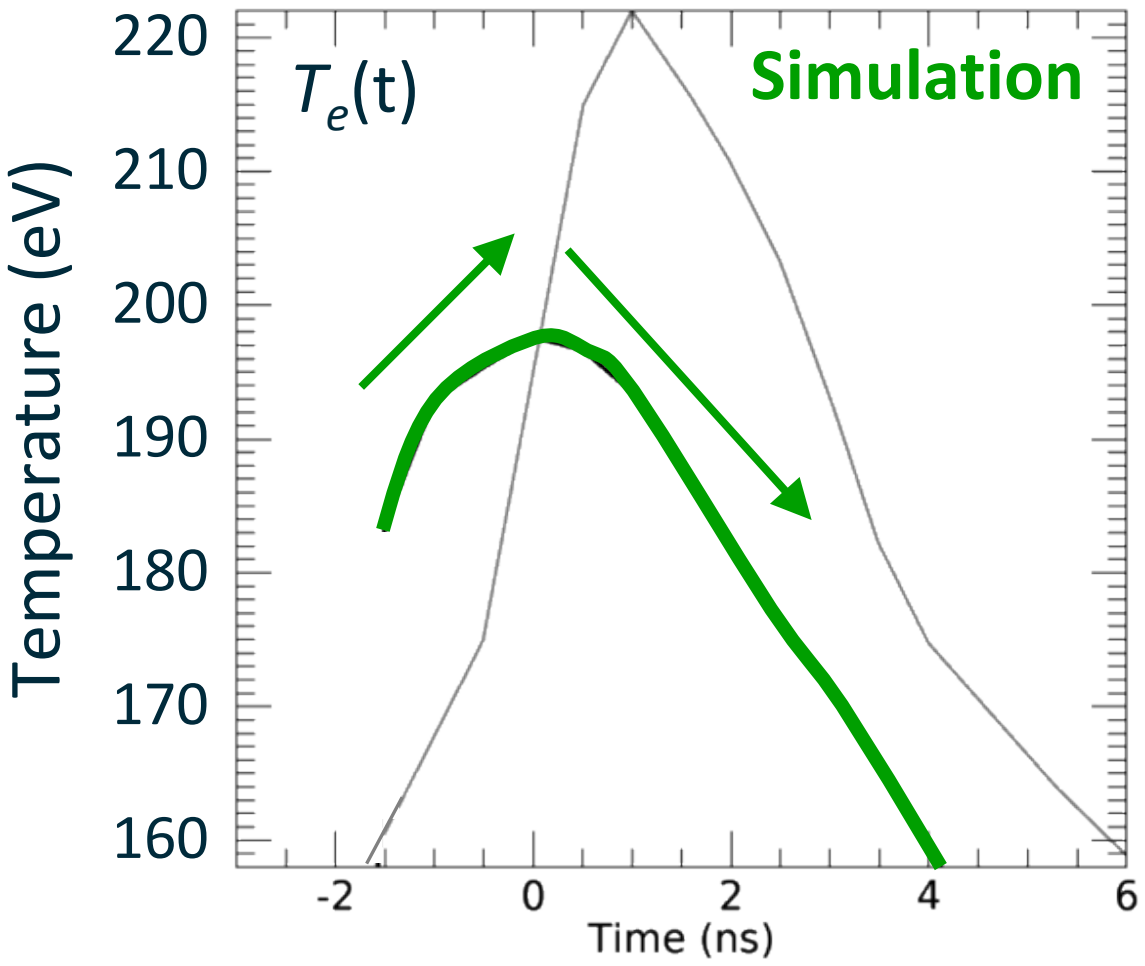
Anchor3

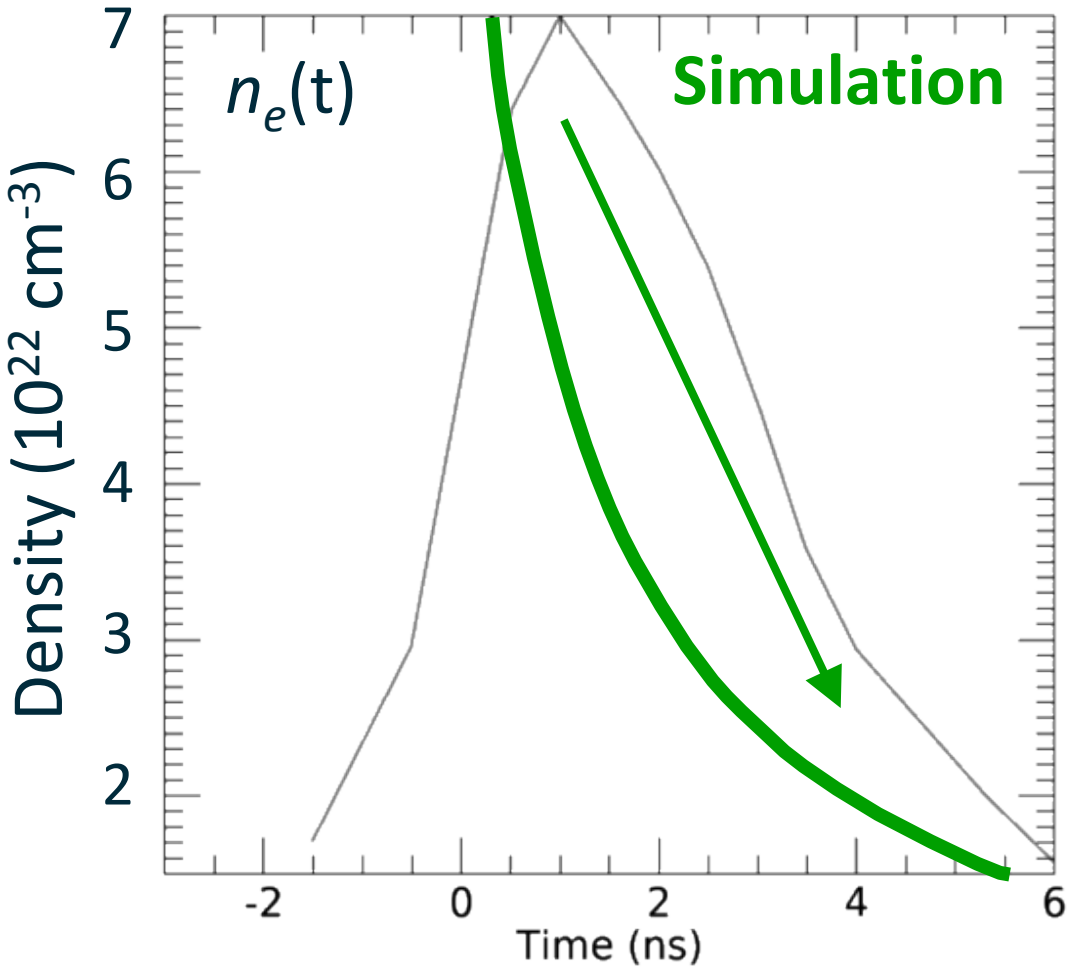
Thick CH:
T_e=196 eV
n_e=3.8x10^{22} cm^{-3}



It is ideal to measure iron opacity at higher density

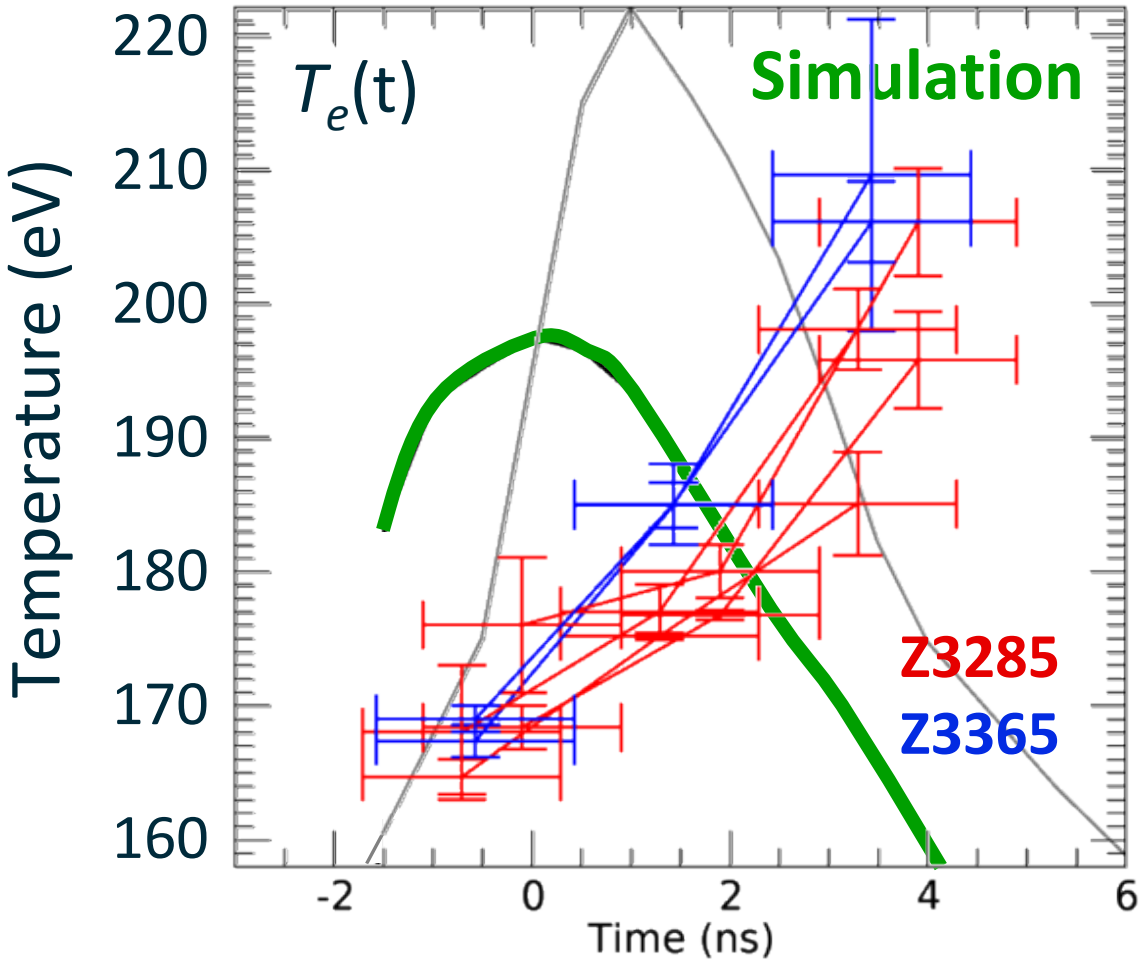
Our time-resolved temperature and density measurements suggest a path towards higher-density opacity measurements

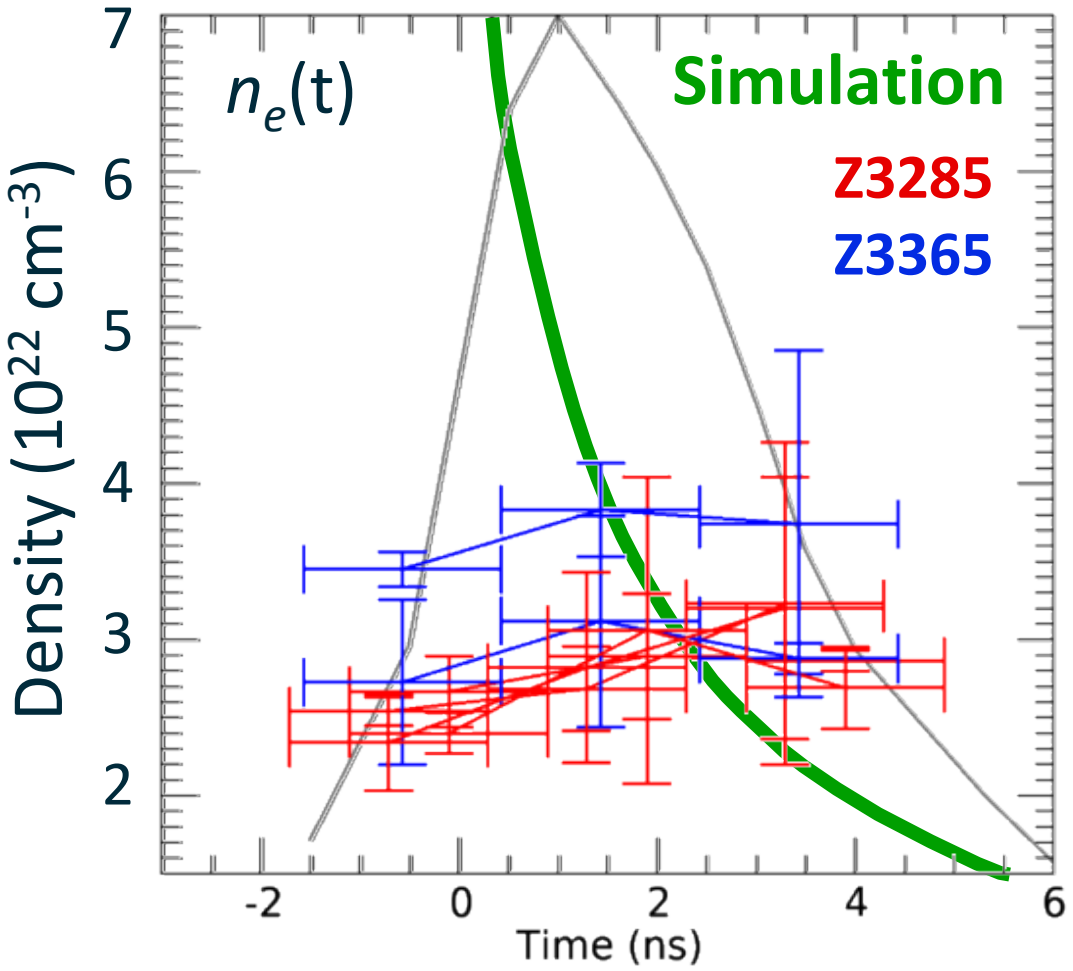




The sample is already expanded; Maybe, there is some unintended preheat

Our time-resolved temperature and density measurements suggest a path towards higher-density opacity measurements





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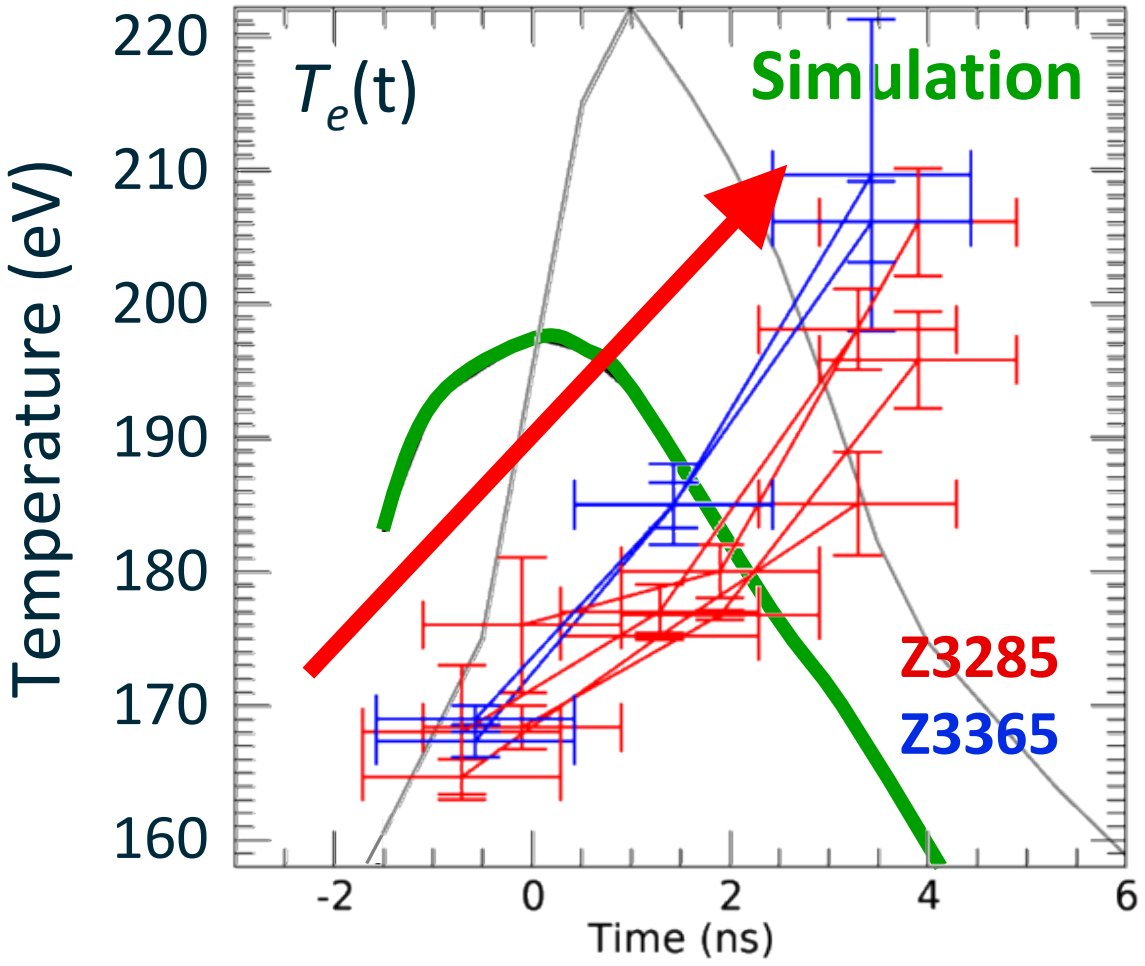
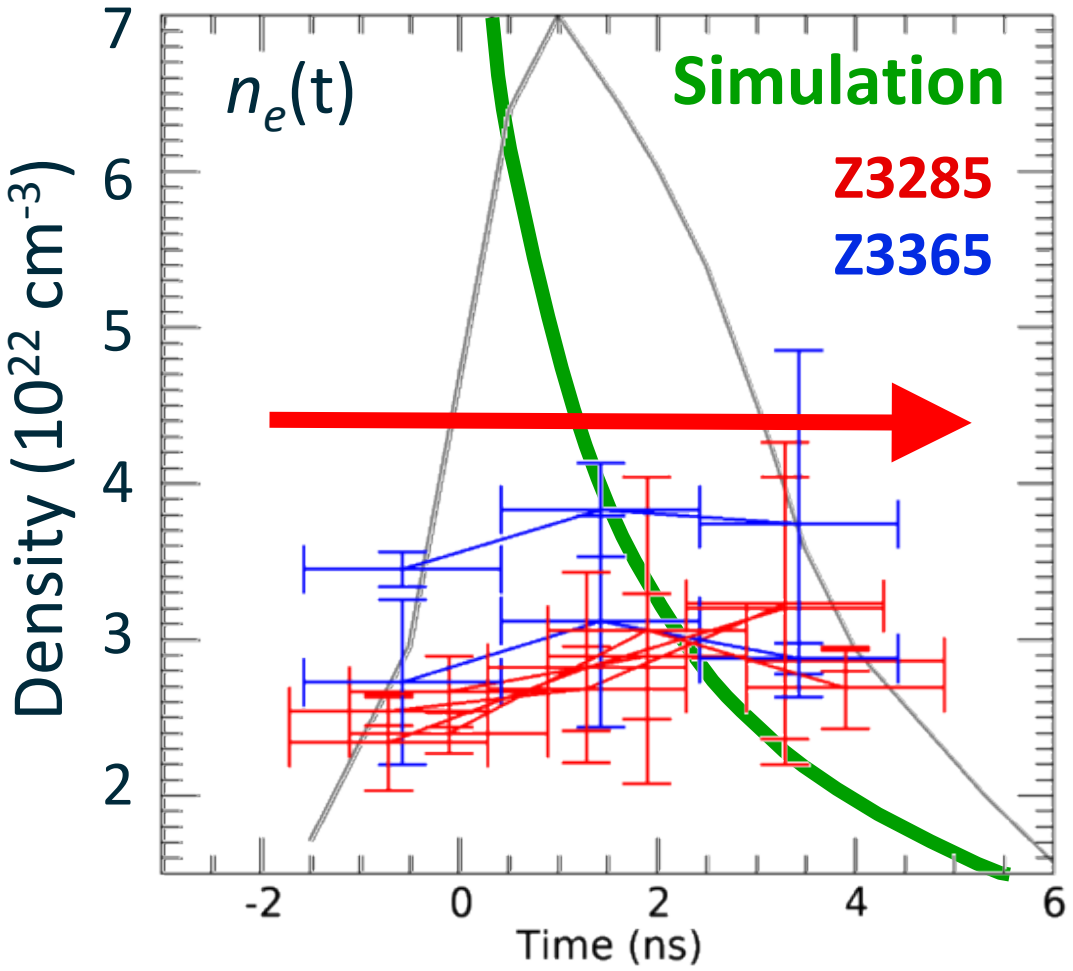
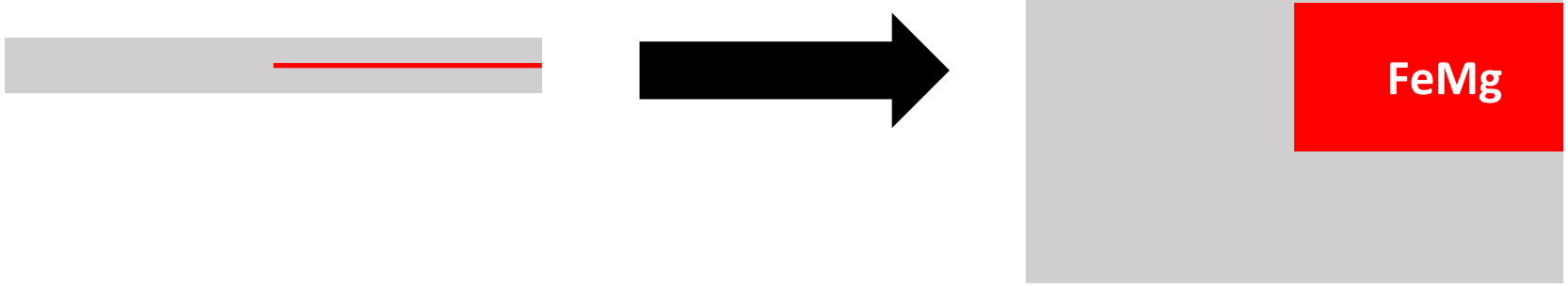




The sample is already expanded; Maybe, there is some unintended preheat

Shielding the preheat can help us measure Fe opacity at higher density than we ever achieved

Sample starts from the solid density



Somehow expanded ….

Time-resolved measurement is essential due to potential rapid change in CSD

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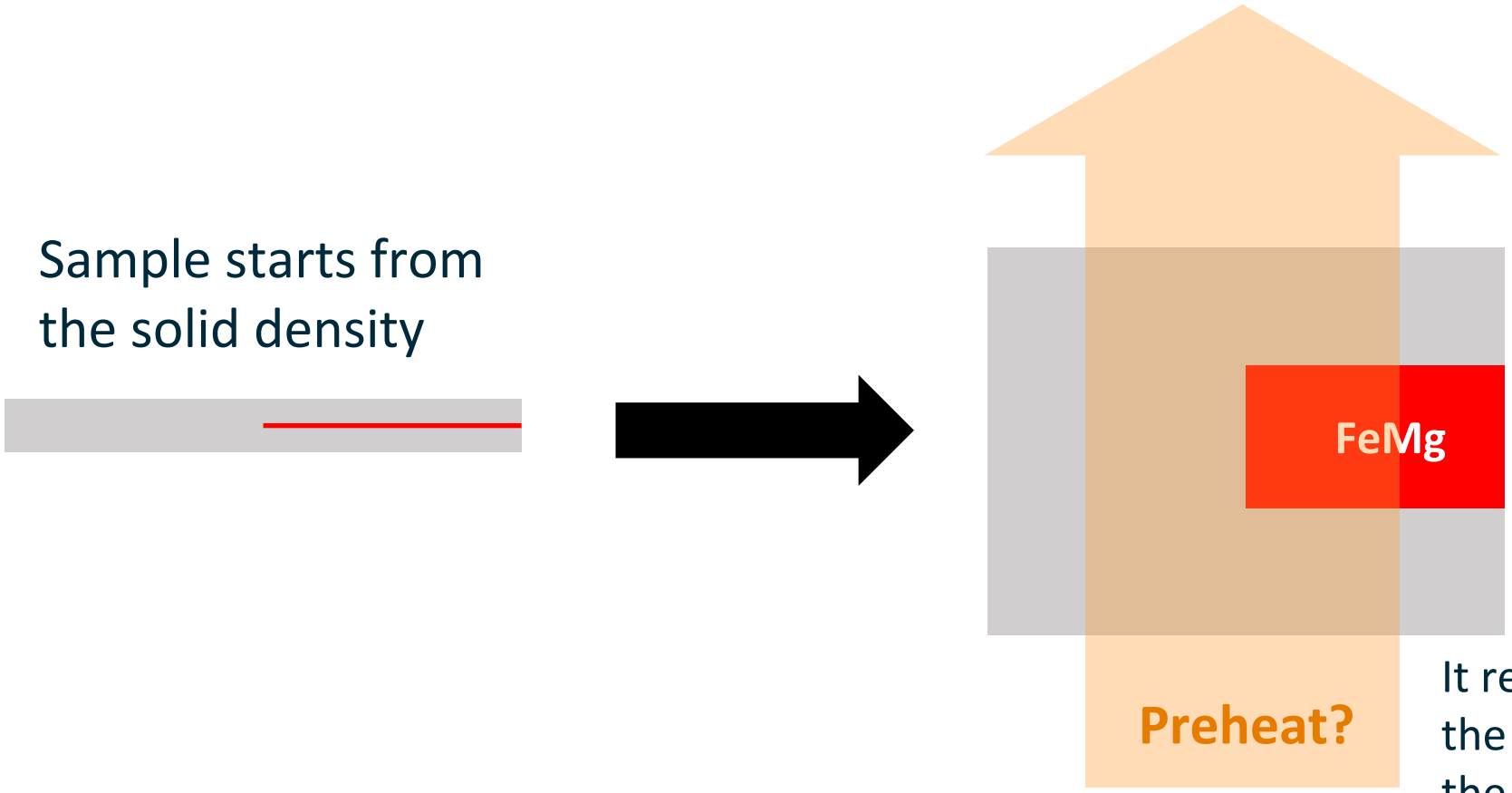


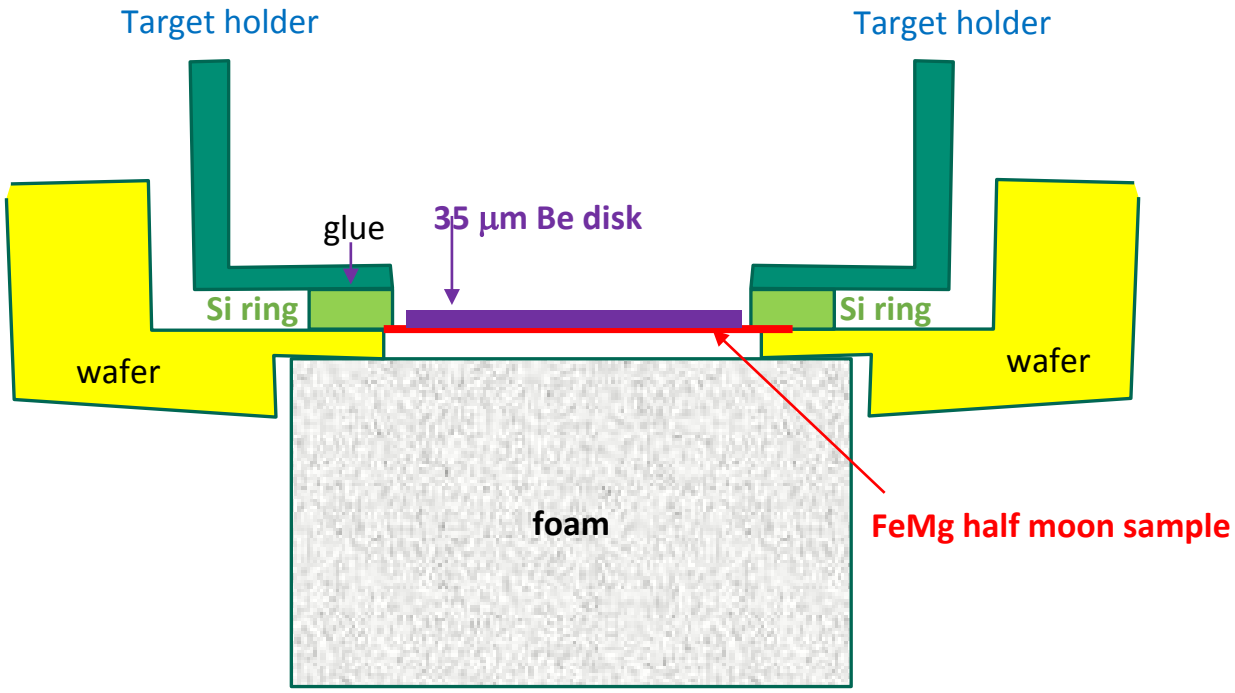
It requires some preheat for the sample to be expanded at the time of the backlight

Time-resolved measurement is essential due to potential rapid change in CSD

We are going to shield the preheat using the following shielding designs

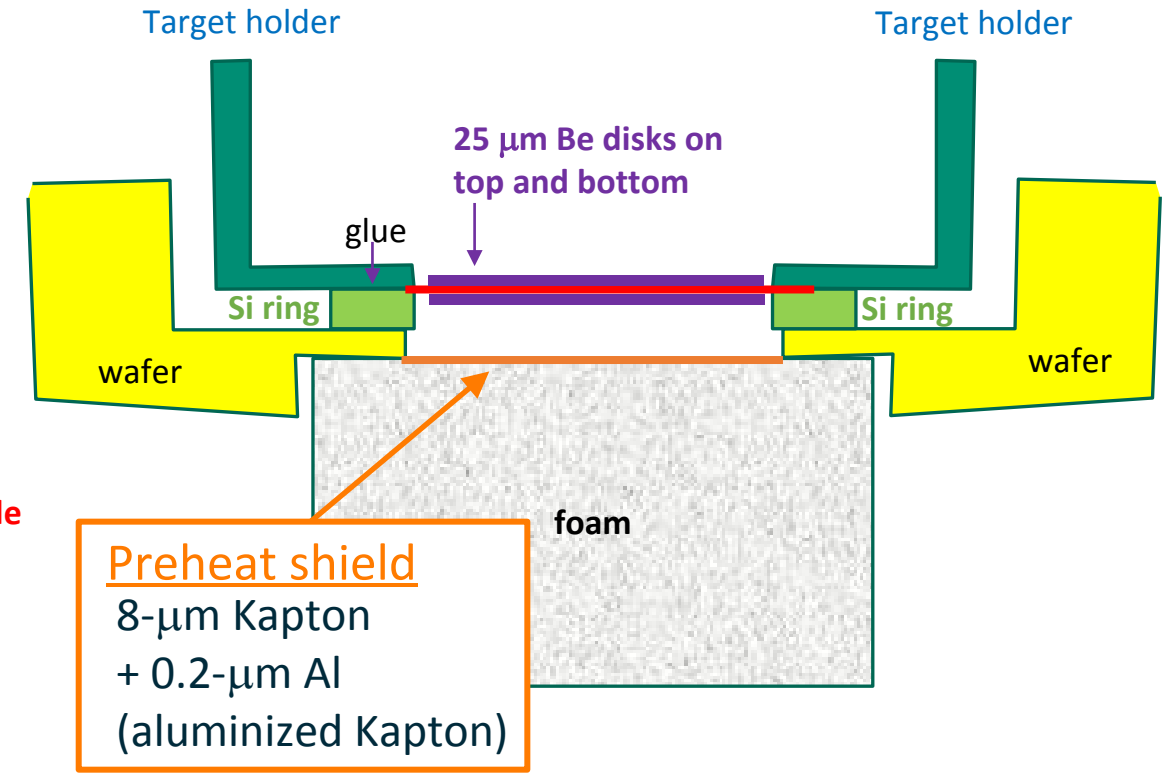
Standard configuration:

Foam-to-sample distance: **0.25 mm**



Preheat shield config1:

Foam-to-sample distance: **0.75 mm**



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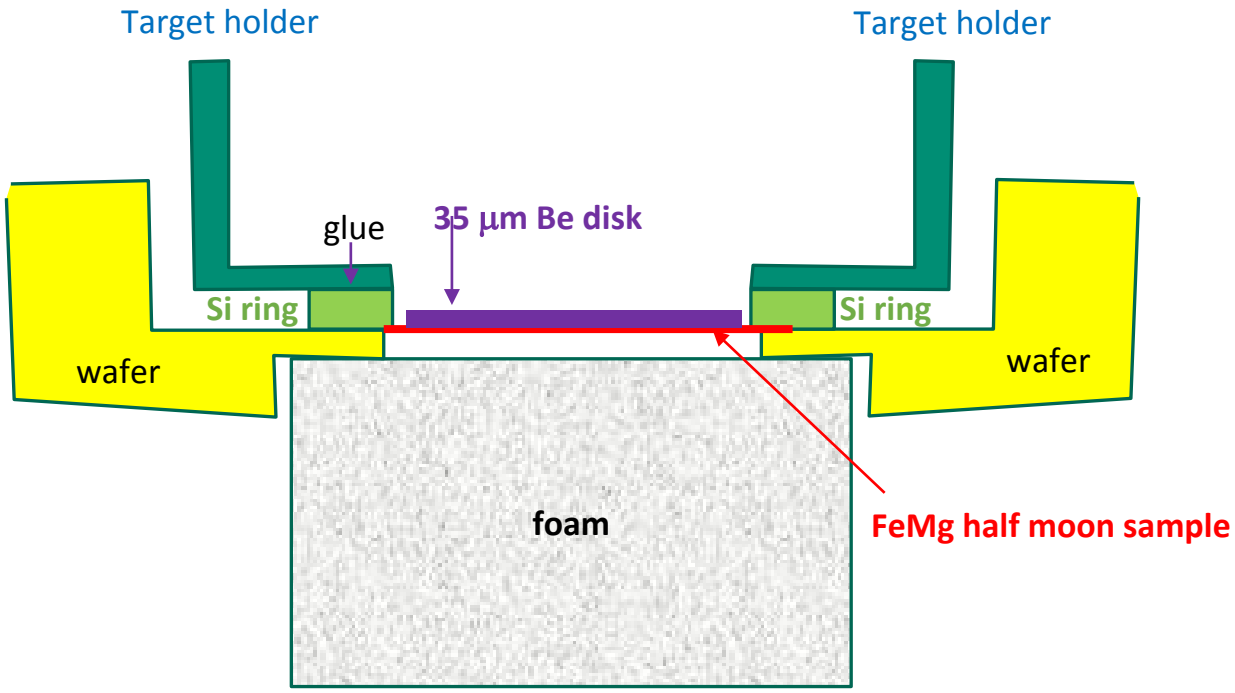

Preheat shield config2:

Foam-to-sample distance: **0.50 mm**