

Update on the preliminary TDI design

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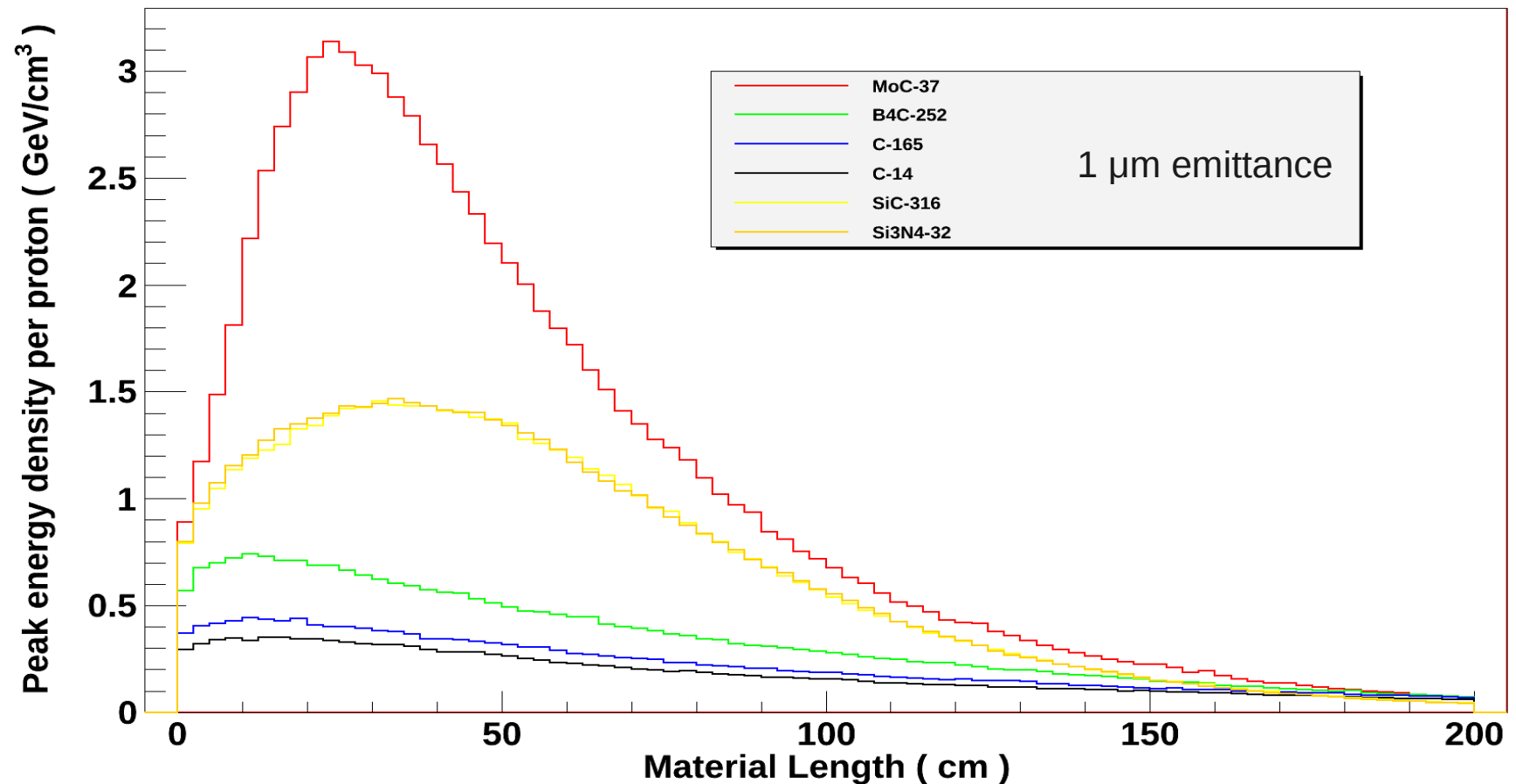
TDI upgrade meeting
Dec 11th , 2012

Introduction

- Assessment of possible leading material blocks (low-density)
- Evaluation of different longitudinal sandwich (composite) structures
- FLUKA simulations:
 - simple material blocks with 5 cm lateral width, beam parallel to axis of material blocks and impacting in the center of the block
 - Calculations were done for both beam specs: LIU nominal and LIU max (no divergence applied, contribution of dispersion to beam size neglected as it only contributes little)
- Energy density maps used as input for ANSYS calculations to evaluate temperature increase and stresses (preliminary)

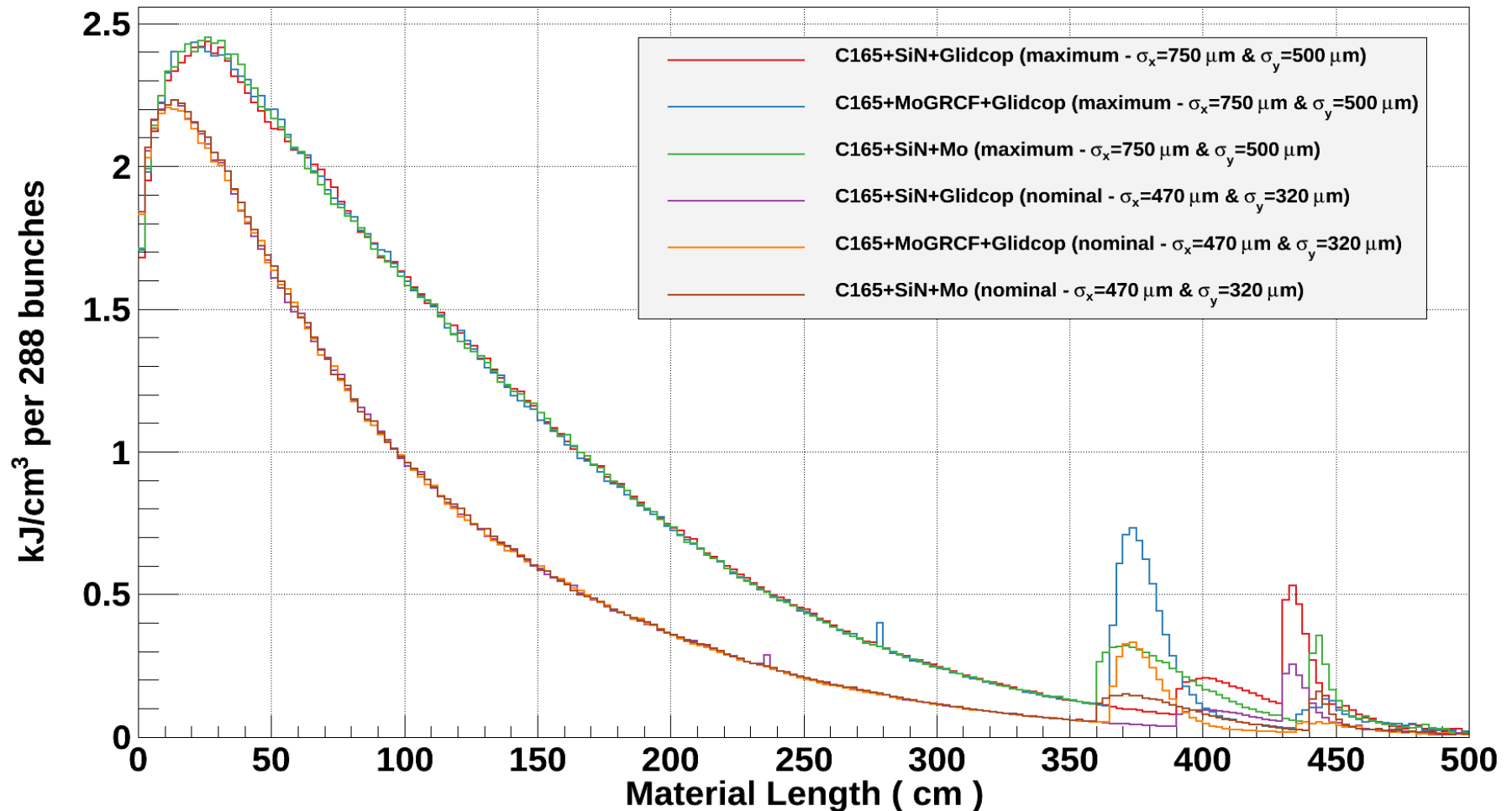
Energy density in some materials

- Some medium-density materials (MoC, SiC, Si₃N₄) are obviously not suitable for leading blocks but are included for comparison
- B₄C was ruled out in ANSYS calculations
- ANSYS: both low-density carbon compounds in principle suitable but CfC-1.65g/cm³ (AC 150 C/C) favorable despite slightly higher energy density



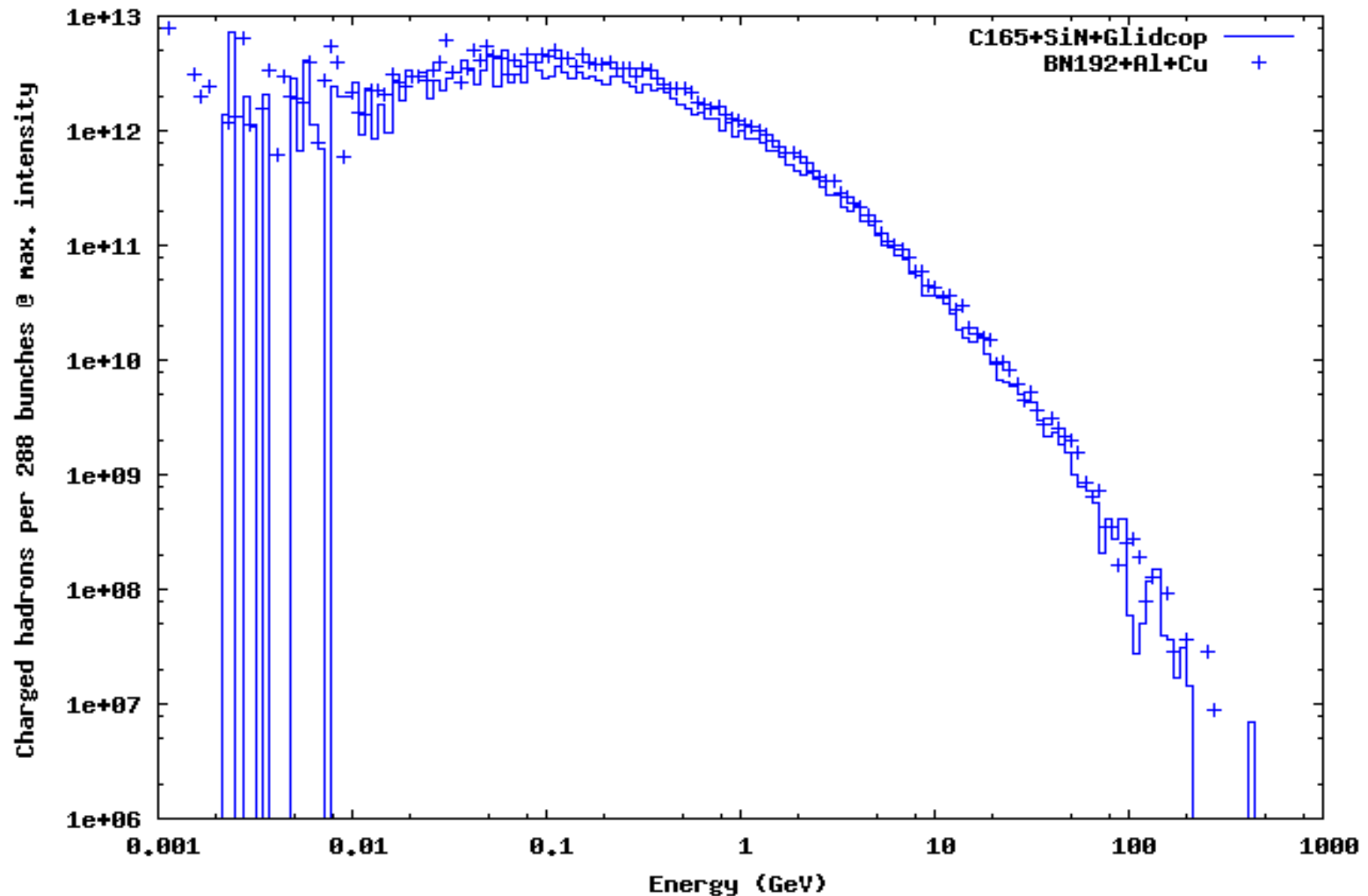
Composite blocks (5 m length)

- Assumptions:
 - total length of the block is 5 m
 - total length of the block corresponds to 14 interaction lengths



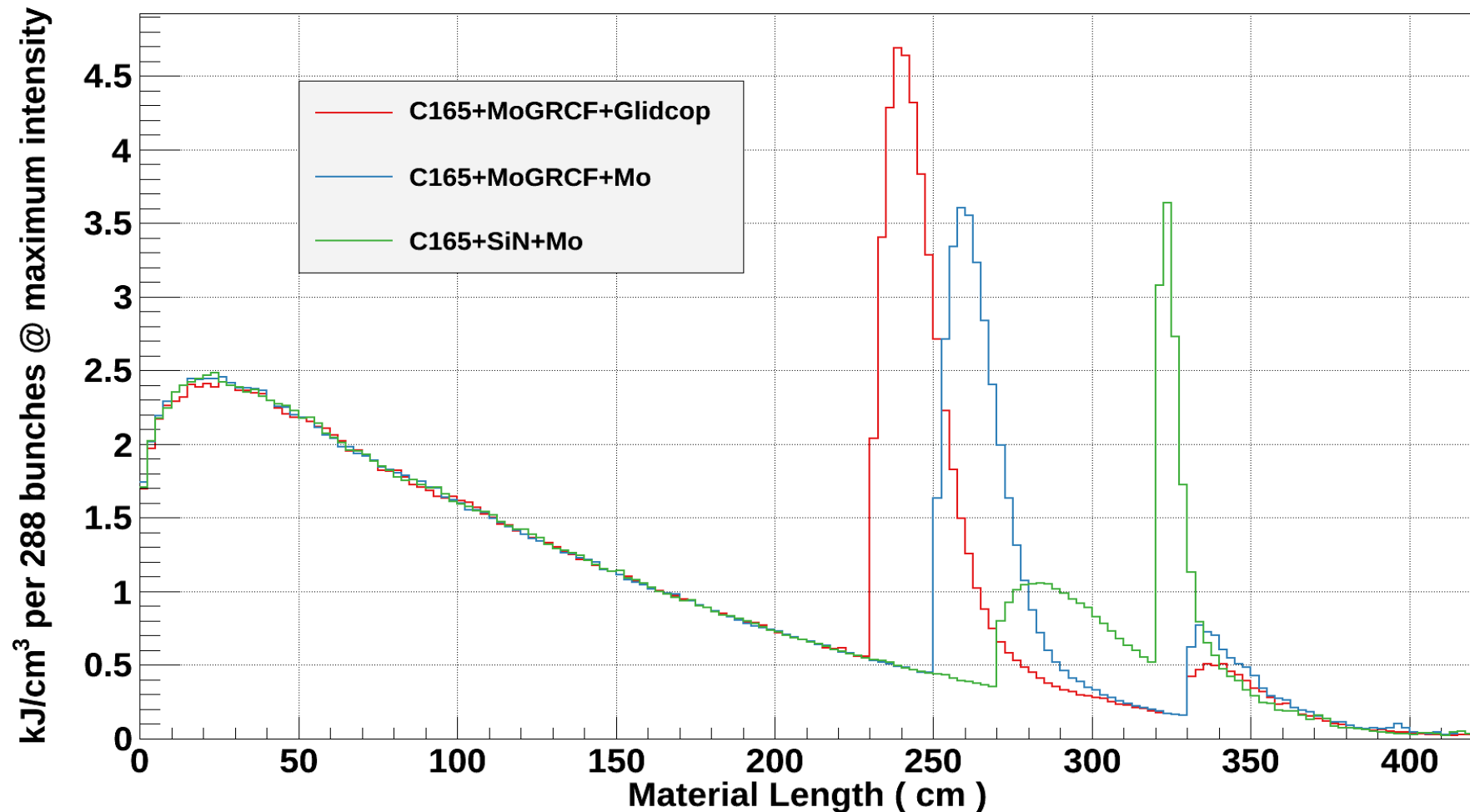
Leakage comparison

- Down stream leakage of charged hadrons
- Design case (7.2e13 protons) and current TDI (4.91e13 protons)



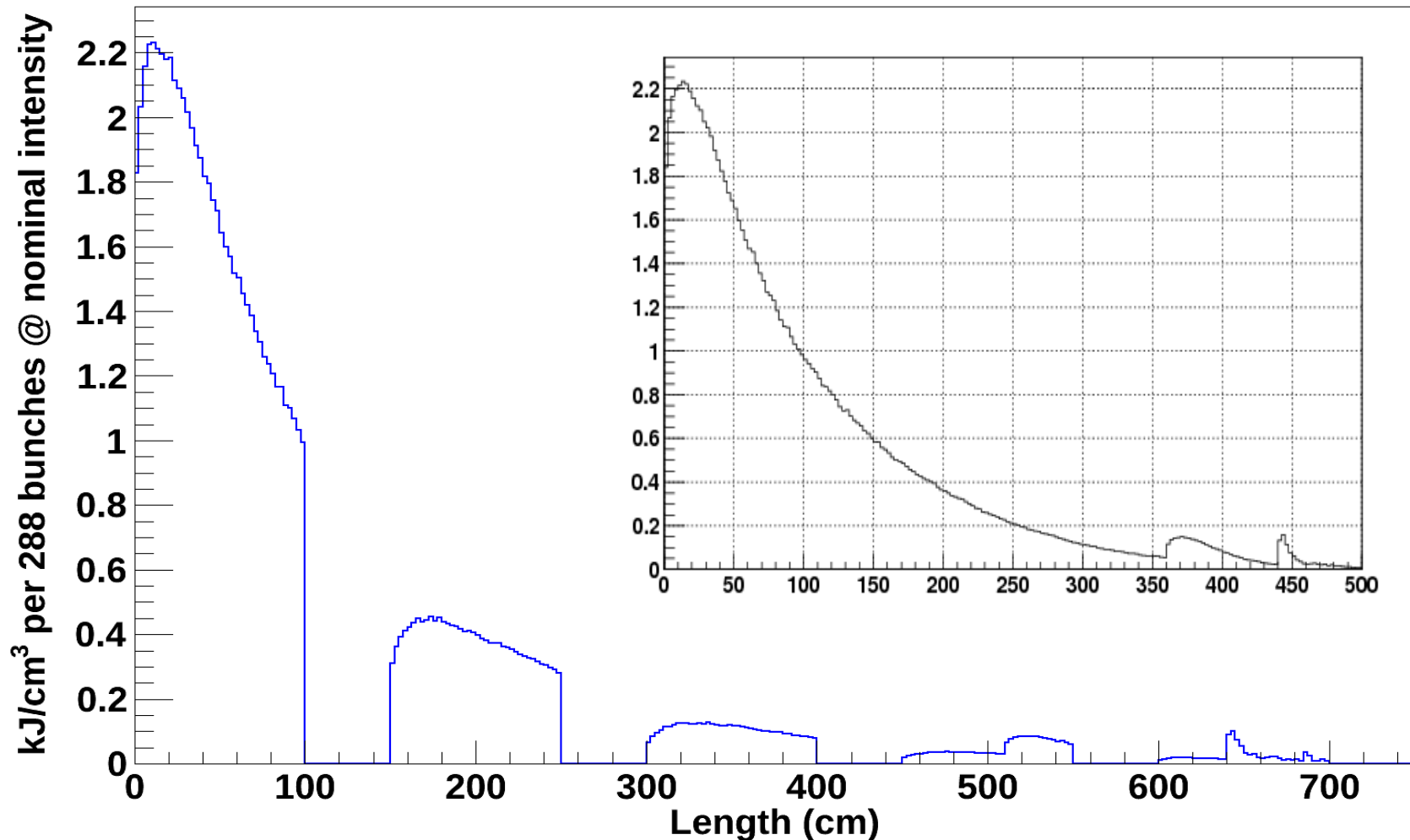
Composite blocks (4.2 m length)

- When the total length is shortened to 4.2 m and for 14 interaction lengths is 14



Modules separated by vacuum

- For C165+SiN+Mo of length 5 m
- 5 modules, each of 1 m in length separated by 0.5 m of vacuum



Comments and Discussion

Current TDI

