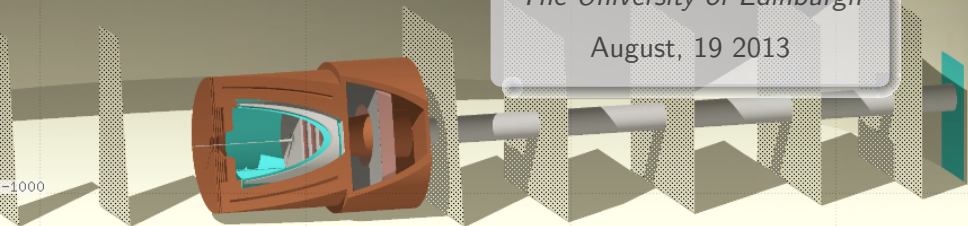


# SoLID

## Radiation and Activation with SoLID

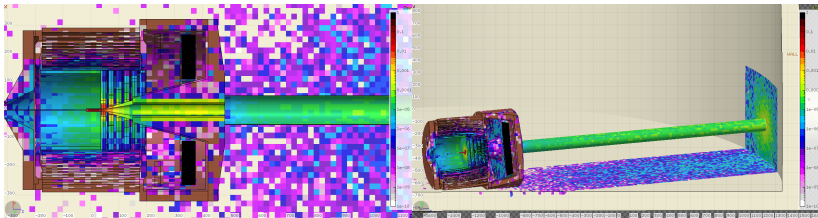
Lorenzo Zana  
*The University of Edinburgh*  
August, 19 2013



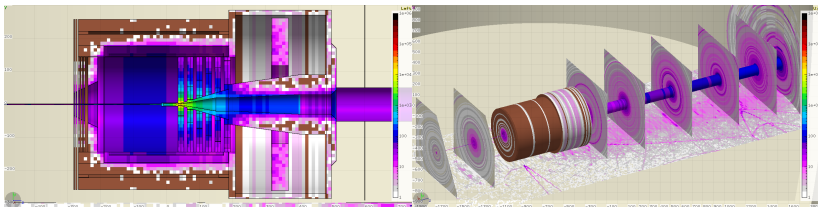
- 1 Power and Activation
  - PVDIS
  - SIDIS
  
- 2 Radiation in Hall at runtime
  - Goal
  - PVDIS
  - SIDIS
  
- 3 Conclusions

# SoLID PVDIS: Power and Activation

$E_{dep}(W)/cm^3$  PVDIS, Liquid D target (100 $\mu A$ )

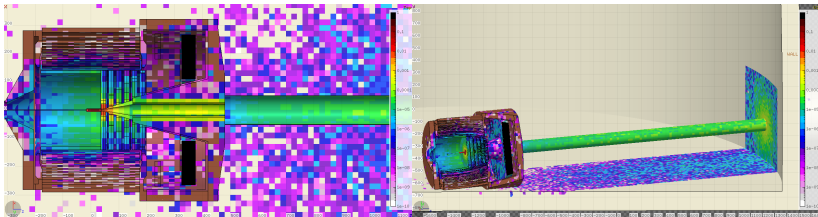


$Dose_{eq}(mrem)/h$  after 1 hour from beam exposure (1 Month running time)

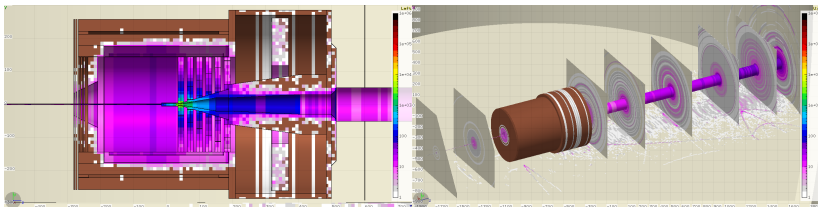


# SoLID PVDIS: Power and Activation

$E_{dep}(W)/cm^3$  PVDIS, Liquid D target (100 $\mu A$ )

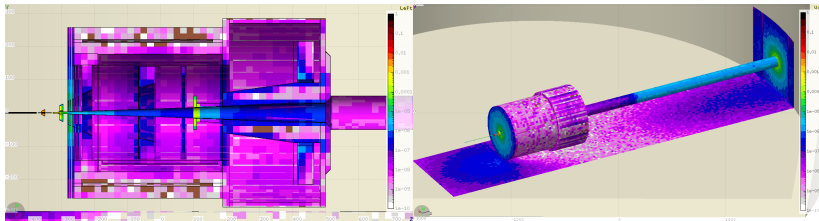


$Dose_{eq}(mrem)/h$  after 1day from beam exposure (1 Month running time)

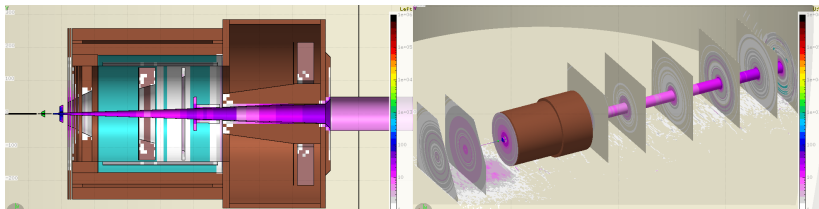


# SoLID SIDIS: Power and Activation

$E_{dep}(W)/cm^3$  SIDIS, Liquid  $^3He$  target ( $15\mu A$ )

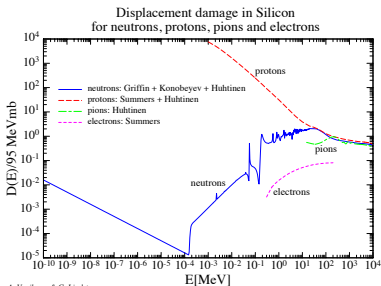


$Dose_{eq}(mrem)/h$  after 1 hour from beam exposure (1 Month running time)

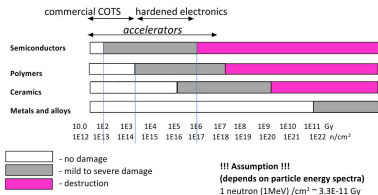


# Radiation Estimates and Tolerance

## Radiation Estimates



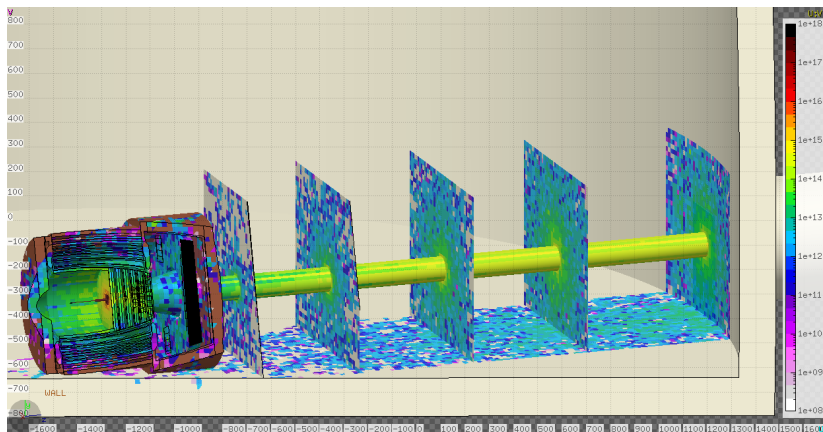
## Tolerance (guideline)



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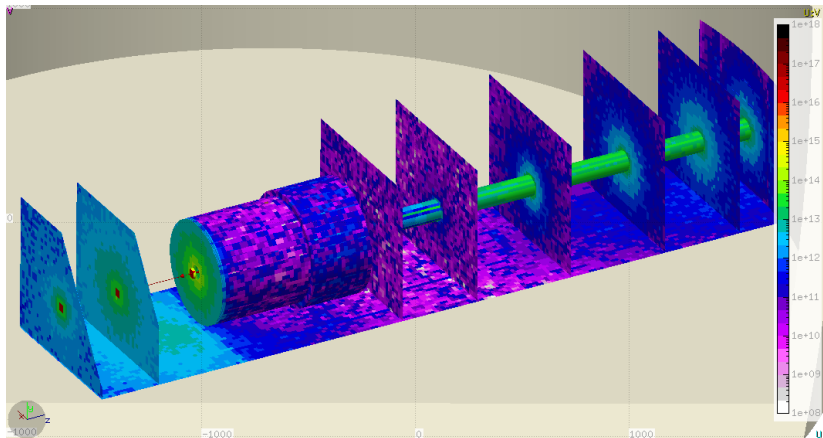
# SoLID PVDIS: 1MeVeq Neutrons

*Neutrons(1MeV – eq)/cm<sup>2</sup> PVDIS, Liquid D target  
(100μA for 2000hours)*



# SoLID SIDIS: 1MeVeq Neutrons

*Neutrons(1MeV – eq)/cm<sup>2</sup> SIDIS, Liquid <sup>3</sup>He target  
(15μA for 3000hours)*

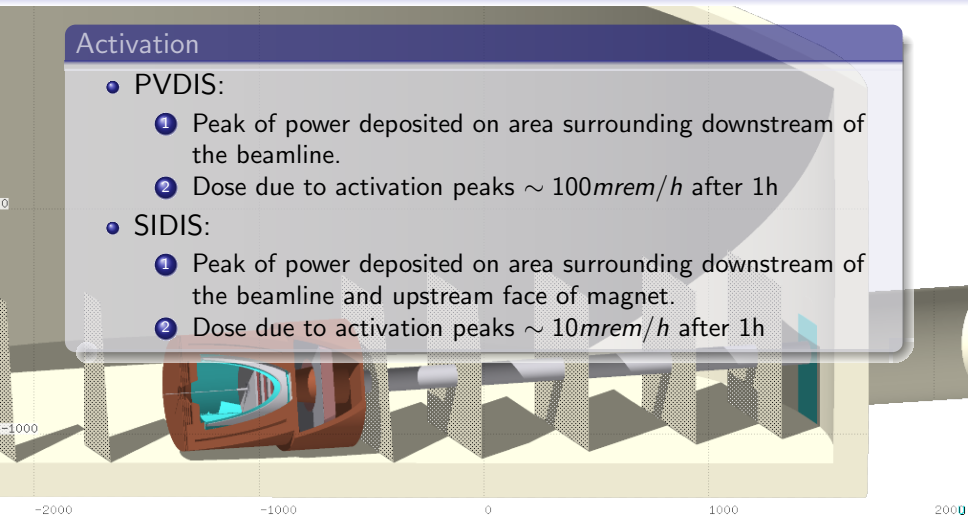




# Conclusions

## Activation

- PVDIS:
  - ① Peak of power deposited on area surrounding downstream of the beamline.
  - ② Dose due to activation peaks  $\sim 100\text{mrem}/\text{h}$  after 1h
- SIDIS:
  - ① Peak of power deposited on area surrounding downstream of the beamline and upstream face of magnet.
  - ② Dose due to activation peaks  $\sim 10\text{mrem}/\text{h}$  after 1h



# Conclusions

## Activation

- PVDIS:
  - ① Peak of power deposited on area surrounding downstream of the beamline.
  - ② Dose due to activation peaks  $\sim 100\text{mrem}/\text{h}$  after 1h
- SIDIS:
  - ① Peak of power deposited on area surrounding downstream of the beamline and upstream face of magnet.
  - ② Dose due to activation peaks  $\sim 10\text{mrem}/\text{h}$  after 1h

## Radiation in the Hall

- PVDIS: Peak surrounding downstream beamline  $< 10^{15} \frac{N_{1\text{MeVeq}}}{\text{cm}^2}$
- SIDIS: Peak surrounding target area  $< 10^{14} \frac{N_{1\text{MeVeq}}}{\text{cm}^2}$