

Geant4 HD-XA Supercell simulation

- **very preliminary**
 - SiPM efficiency not accounted for => all photons reaching a SiPM are counted (PCE)
 - many parameters are estimated
 - no way to validate the simulation (too many variables)
 - results are not consistent with the measured efficiency in absolute terms
 - different SC configurations give relative efficiency values that behave as expected
 - simulation:
 - optical photons generated isotropically at 5cm from the SC surface
 - shifting by the pTP layer
 - interaction with the dichroic
 - shifting by the lightguide
 - trapping by lightguide, dichroic coating and vikuiti
 - all photons reaching a SiPM surface are detected
- Absorption
 - Rayleigh scattering

Dichroics comparison - PCE

in geant4 a border surface has a direction

- dichroic can be activated for light coming from the pTP and the SC inside separately



Dichroic	inwards+outwards	only outwards	only inwards	measure
ZAOT_TiO2-SiO2	0.0029	0.0262	0.00231	-
ZAOT_nov	0.0192	0.0235	0.017	-
ZAOT_may	0.0153	0.023	0.014	0.02098
OPTO	0.0137	0.0255	0.0113	0.02061

NO dichroic PCE = 0.0205

- in the simulation most of the light is trapped by the WLS light guide
 - the dichroic coating decreases PCE

post talk note: the increase in PCE w/o dichroic filters was caused by a problem in the code, the relative performance between coatings is still (indicatively) valid