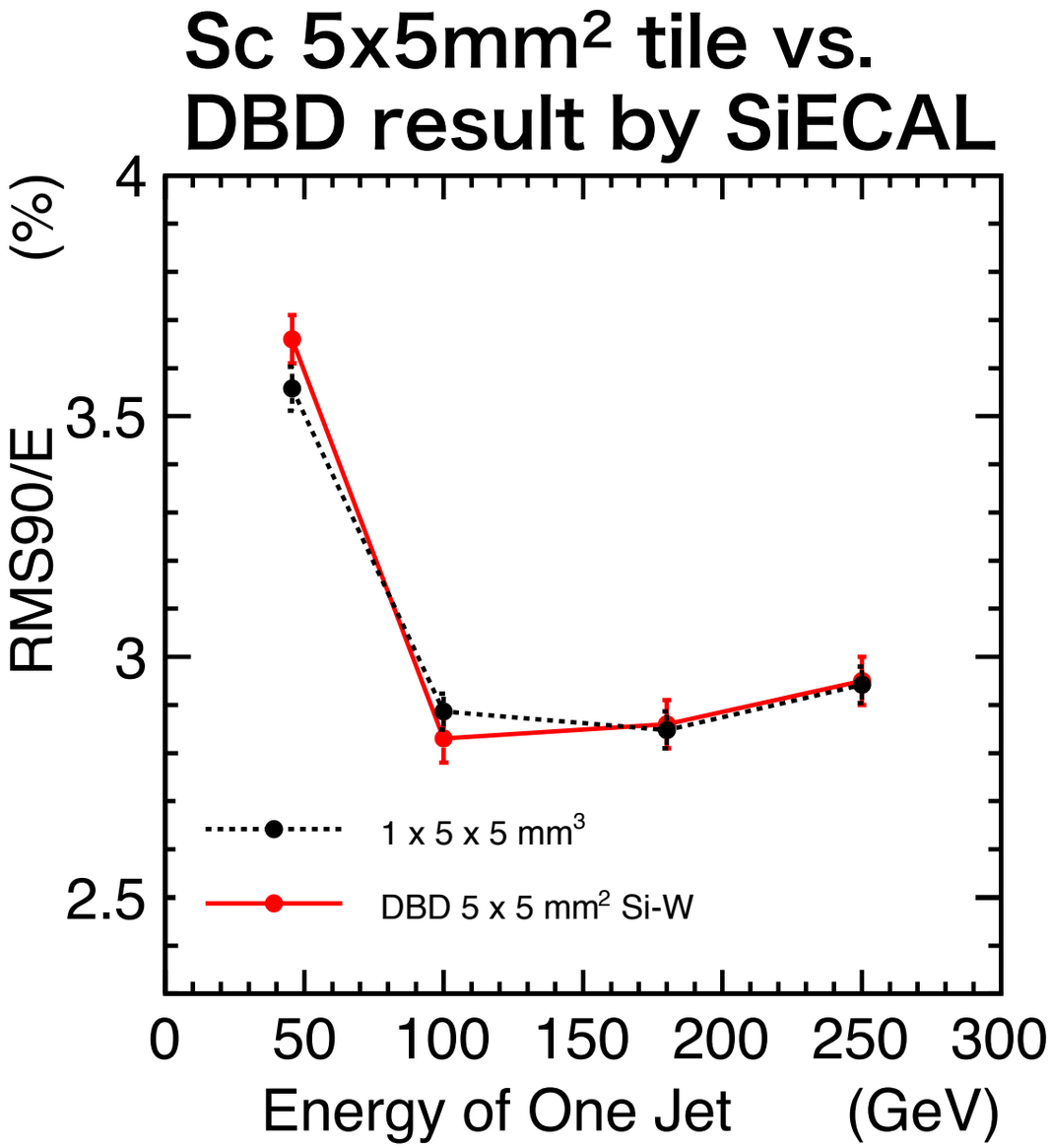
Some progresses of SSA study

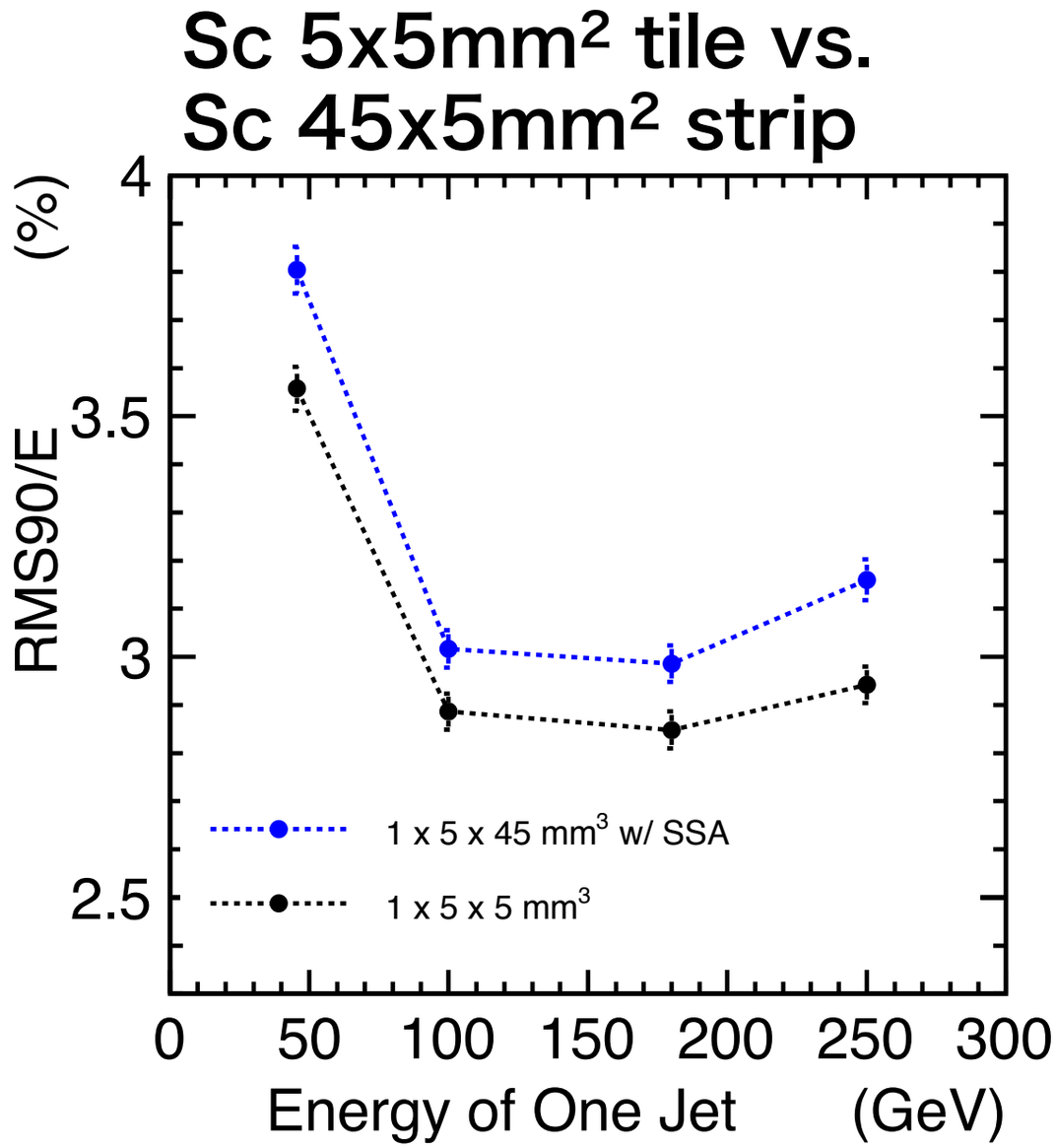
18 October 2013

K. Kotera
Shinshu University

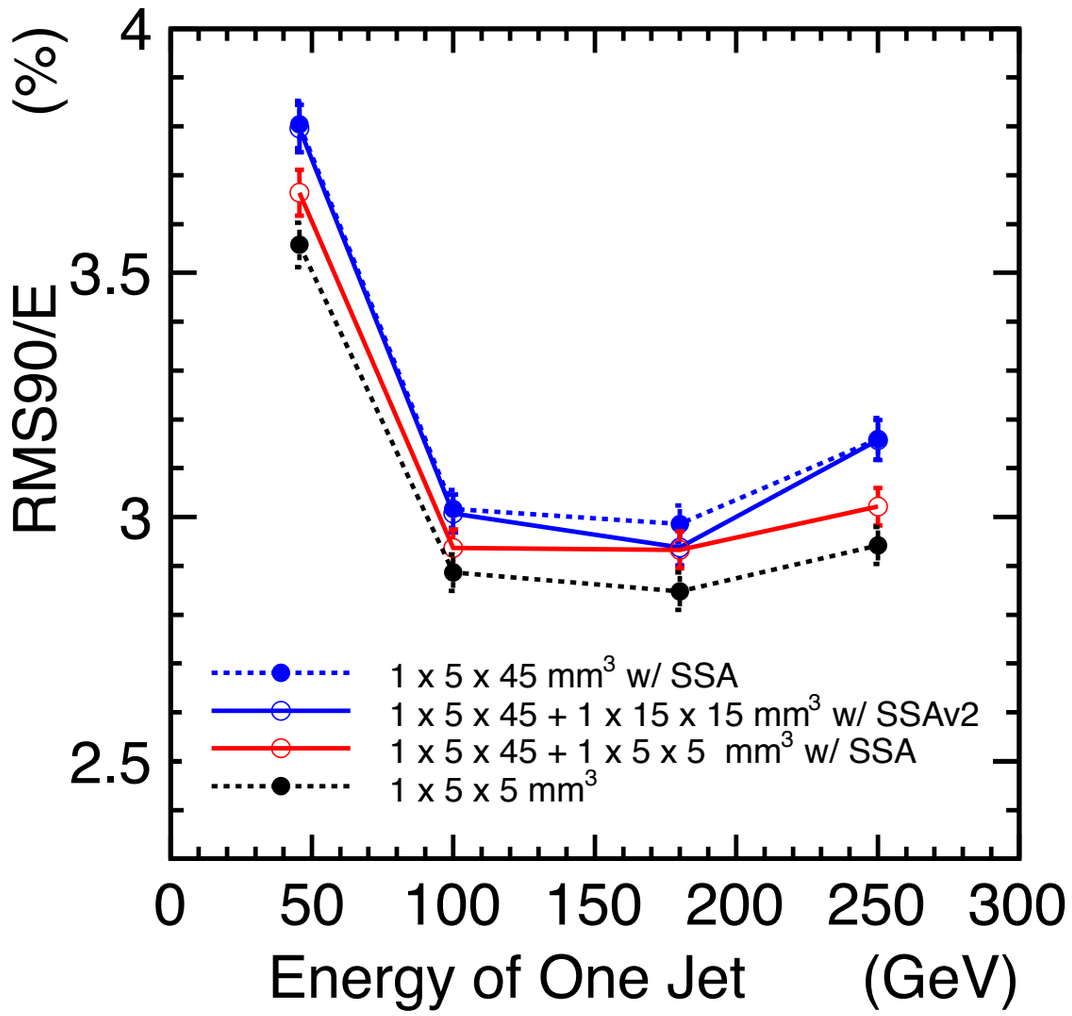
For Physics-Software meeting of ILD-Asia

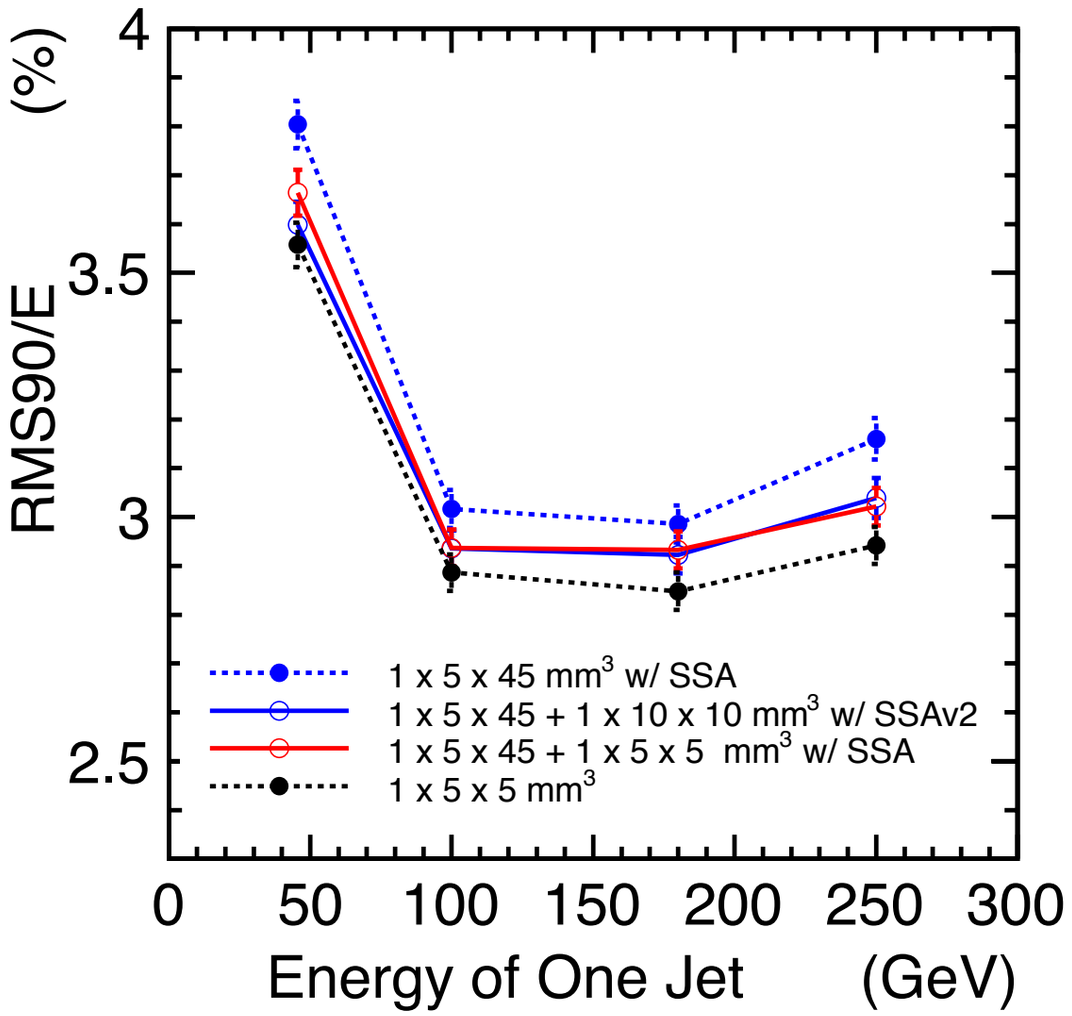
uds jet energy: ScECAL vs DBD(Si-W-ECAL)





alternative half of layers are replaced with tile layers to avoid the ghosts



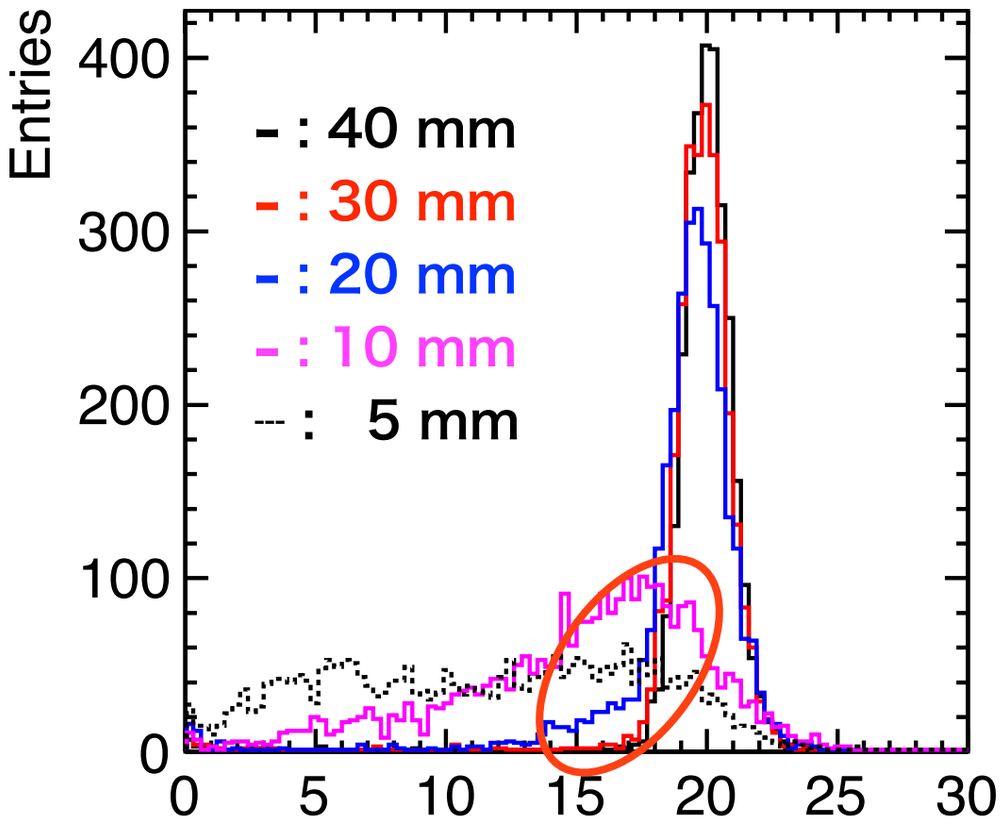


alternative with 5x5 mm² tile layers (right -○-)
➡ close to all 5x5 mm² tile ScECAL (right -●-·).
alternative with 15x15 mm2 tile layers ➡ not so improves -●-
alternative with 10x10 mm2 tile layers (left -●-)
➡ almost similar to the alternative with 5x5 mm²

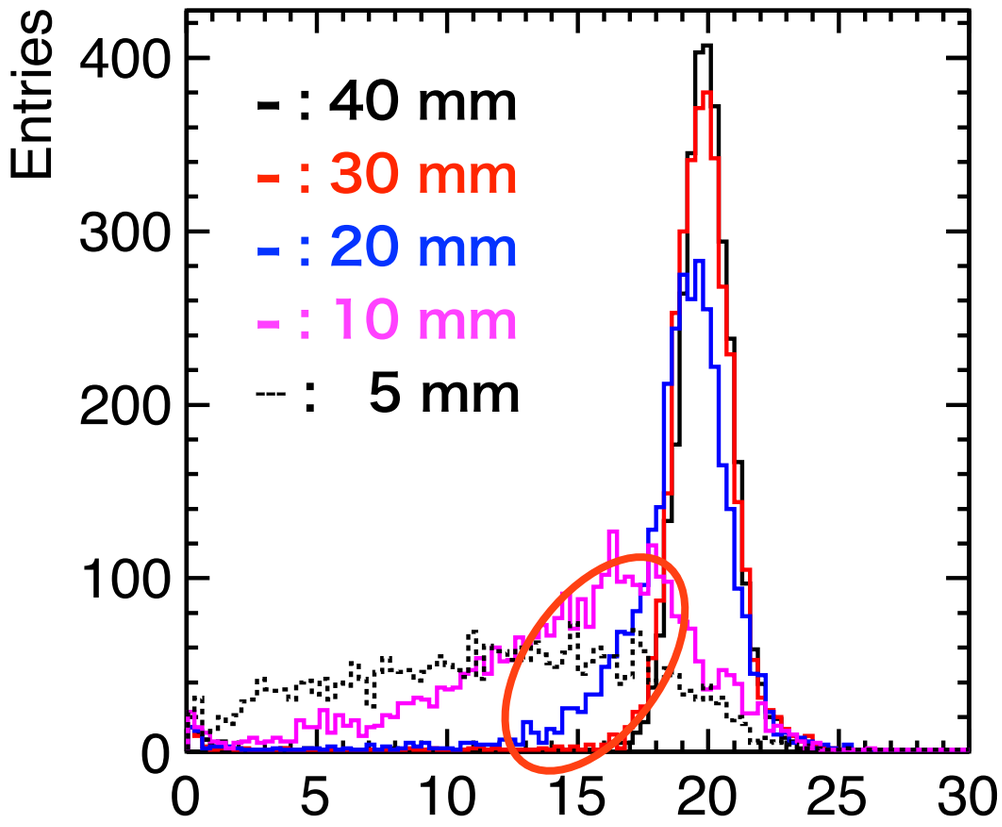
Measured photon energy (1 γ event)

π^+ 10GeV + photon 20 GeV

5x5mm²x1mm Tile

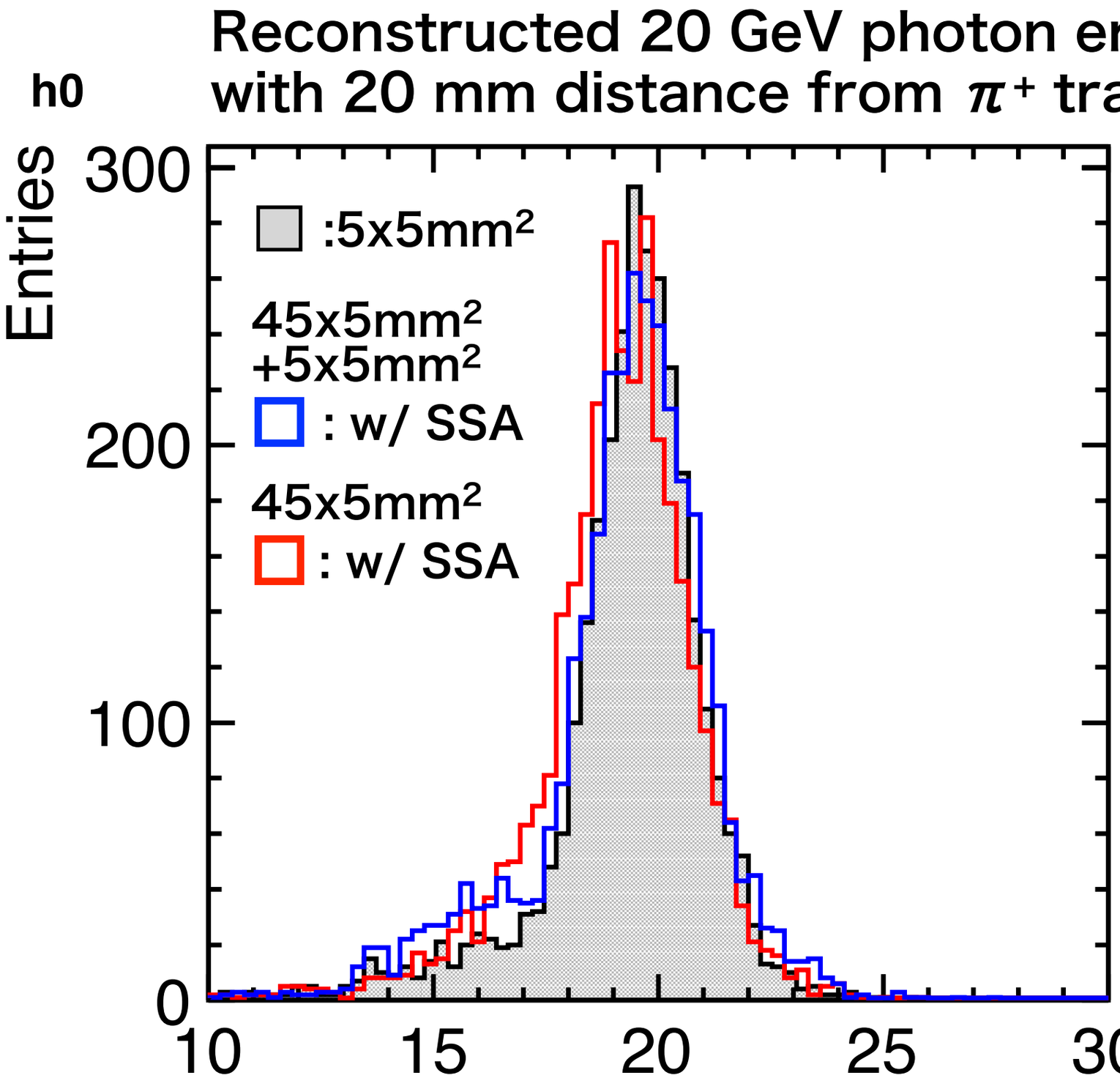


45x5mm²x1mm Strip SSA



- distance > 30 mm ➡ Both types have good energy resolution.
- distance = 20 mm ➡ Strip SSA has a bit leading spread.
- distance <10 mm, 5 mm ➡ Both do not have good resolution.

π^+-γ separation



alternatively replacing with 5x5mm² improves photon energy than pure 45x5mm² strip ECAL,

Leading tail rises rather like a peak with alternative tile/strip case.

Summary and plan

- 5x5 mm² ScECAL has similar performance of JER to DBD result of SiW ECAL,
- a bit degrading (~0.2%) with 45x5 mm² ScECAL w/ SSA,
- alternatively replacing layers with 5 x 5 mm² tile significantly improves the JER of strip ScECAL,
- 15 x 15 mm² tile layers cannot improve
- 10 x 10 mm² tile layers make the same effect as the 5x5 mm²,
- alternative insertion of 5 x 5 mm² tile layers certainly improves π^{+}-γ separation.

Plan

- 20 layers (strip45x5/5x5tile), 10 layers (strip 45x5), running
- 20 layers (strip45x5/10x10tile), 10 layers (strip 45x5),
- n layers (strip45x5/10x10tile), 30-n layers (strip 45x5).