Discussion on the RD trigger – How to go on?

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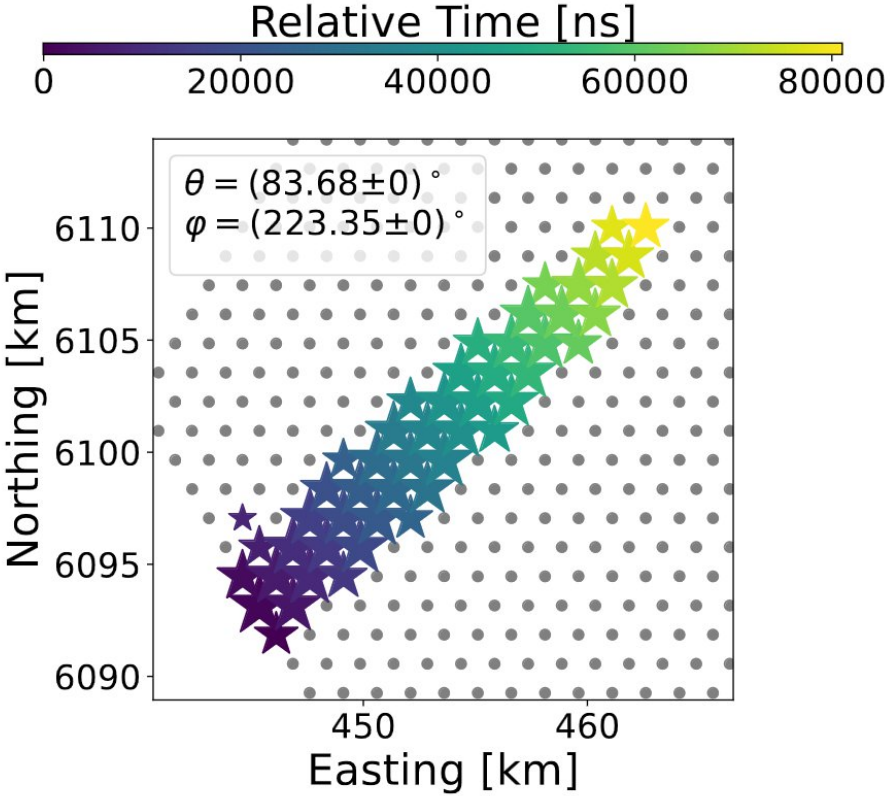
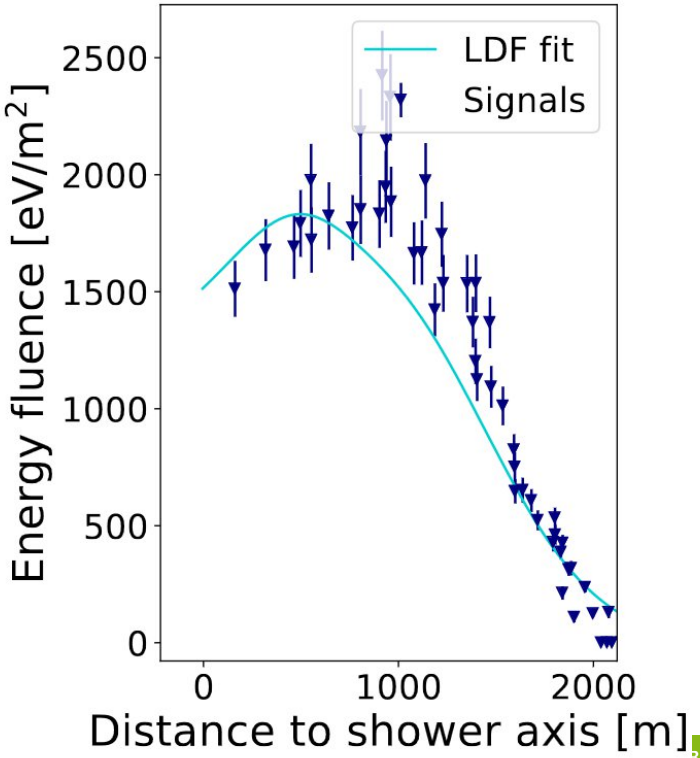
RD trigger – quick recap

- **Robust radio T1 developed which shows triggering on air shower like signals**
- **Measures taken to reject noise (veto of noise-like traces, inhibit during bursts)**
- **Test performed on two neighbouring stations, T2 rate acceptable, no T2 bursts (inhibit working)**
- **Expected pure radio T3 rate too high (correlation of noise radio T2s high) - request WCD T2 coincidence**

RD trigger – what do we want to see?





Outcome of TB

- **No further tests allowed until CDAS test machine is set up**
- **No new stations at other locations**
- **Trigger comissioning comitee decides how to implement new triggers**

Status

- No progress on development since collaboration meeting
- Working group silent after TB
- Need progress on CDAS test bench to continue
- CDAS test machine under construction. Trigger comissioning comitee not formed yet

Proceeding after last TB

Why do we need trigger test data so much?

- **Improve trigger logic: threshold trigger the best option? Periodic data not sufficient**
- **What are the real T3 rates?**
- **Noise pulse rate at all locations the same?**
- **Is noise coming from specific sources? Online geometry reconstruction?**

Proceeding after last TB

No major changes of CDAS allowed. How to move on without a trigger test bench?

I. **Manual: Read all T2s in single stations via USB-stick, including RD trigger**
   + Understand morphology of triggers better
   - Limited time, locations, not feasible having many neighbouring stations, much manpower

II. **Introduce test flag (exclusion just as SCALER exclusion):**
   + No danger for CDAS, much information about T3 morphology
   - No morphology information of trigger traces, slight changes to CDAS

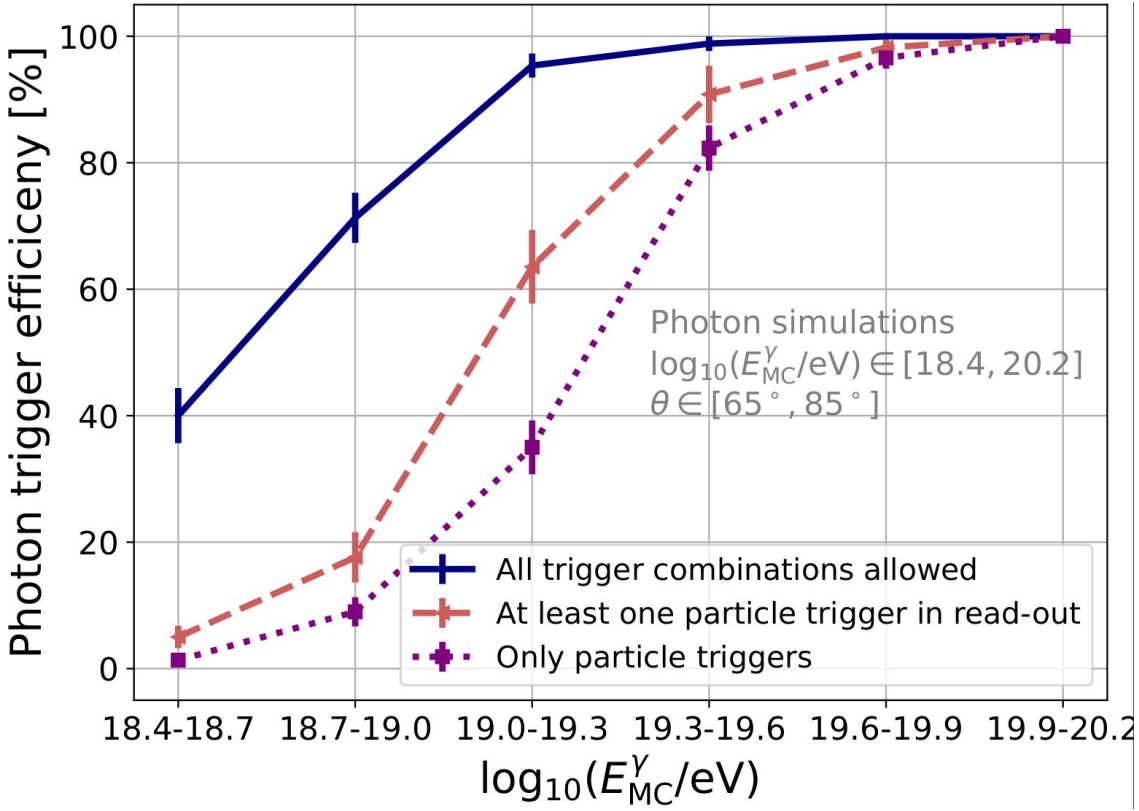
Proceeding after last TB

III. Intermediate RD as T1 only: Do not promote RDs to T2s

+ Extend footprints, see RD triggers, understand morphology of triggers better

- No information on ‘pure noise footprints’

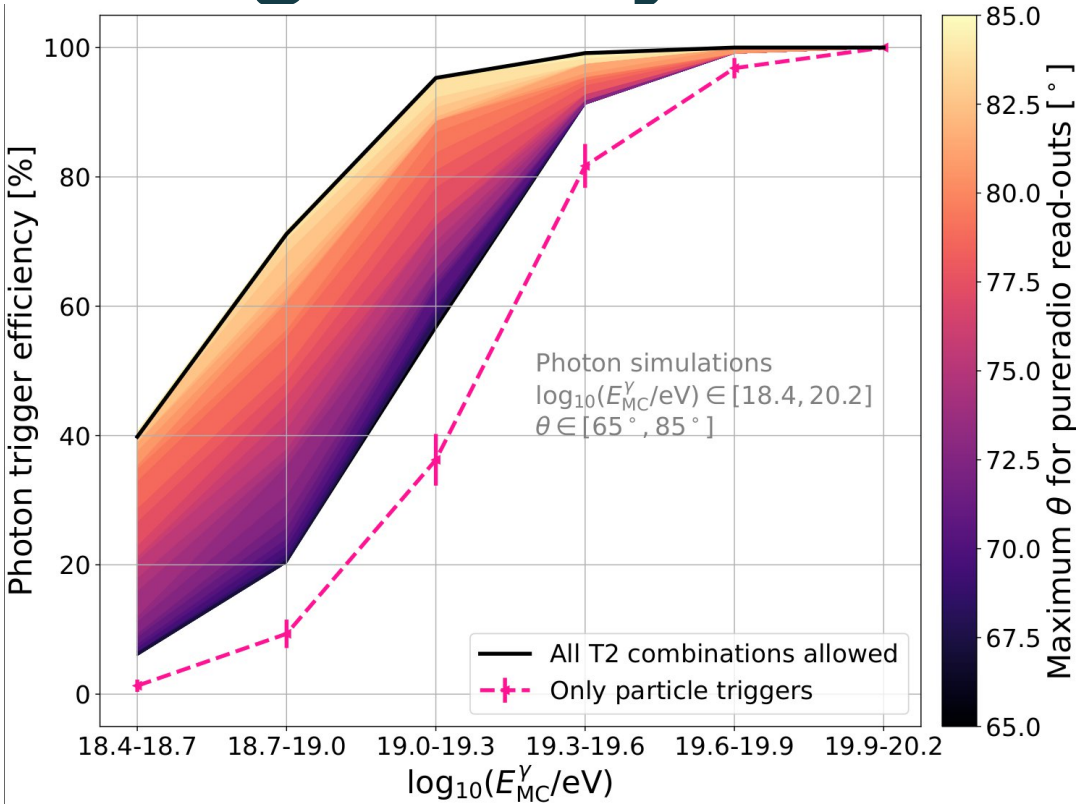
How geometry information could help



Making changes to T3 builder costs trigger efficiency (requesting at least 1 WCD T2 in T3, reject pure RD T3s)

How to recover this efficiency compared to the ideal case of pure RD T3s?

How geometry information could help



RD noise pulse comes mainly from horizon. Horizon is noise dominated
(reject almost all noise while losing nearly no events)

Geometry zenith angle reconstruction based on T2 times
(limitation: microsecond cut)

Accept pure RD T3s coming from zenith angle below defined threshold

In simulations: nice agreement of MC and reconstruction

Also interesting for other triggers?