# HERD 2023 beam test trigger proposal

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### 2023 BT trigger test: FIT & PSD



2023 main-trigger box configuration



2023 new trigger lights:FIT 3IR logic testPSD low-Z veto test

TIPS: there's problems with receiving 3.3V trigger in 2021&2022, so please make sure the pretrigger output is 5V TTL

DI2C Trigger type byte: 2023 definition							
b7	b6	b5	b4	b3	b2	b1	b0
FIT[3]	FIT[2]	FIT[1]	FIT[0]	L2 VETO	PSD	PMT	beam

## 2023 BT trigger test: FIT & PSD



Timing of the beam trigger driven strategy



Timing of the PSD low-Z driven strategy

#### Beam trigger driven strategy:

•There will be an adjustable forward and backward coincidence window

•Any positive edge arrives within the coin window will change the corresponding bit in the trigger type byte

•PSD low-Z driven strategy is a backup choice for test

### 2023 BT trigger test: PD



2023 main-trigger box configuration

•PD L2 veto result bit will be broadcast by trigger type.

•DI2C package will not be terminated, whatever the result of the PD L2 veto is.



## Preliminary proposal for in-orbit pre-trigger protocol





Bit transfer at the duty cycle of a clock, Tianwei suggest this method on 20230328 trigger working group meeting

•Pre trigger will also be transfer to the main trigger box by fiber, ground isolation

•PWM-CDR method could be used, low latency and high throughout

•One fiber is enough for one side of the PSD/FIT, saving cables and connectors

•Pre-trigger information could be sent by serialization, with an order-partition map, encoding is not necessary

•Roll polling instead of the independent trigger,

•Timing slice and the number of the partitions on one side could be a trade-off

# Thanks!