Low Resistivity Glass MRPC test at T10

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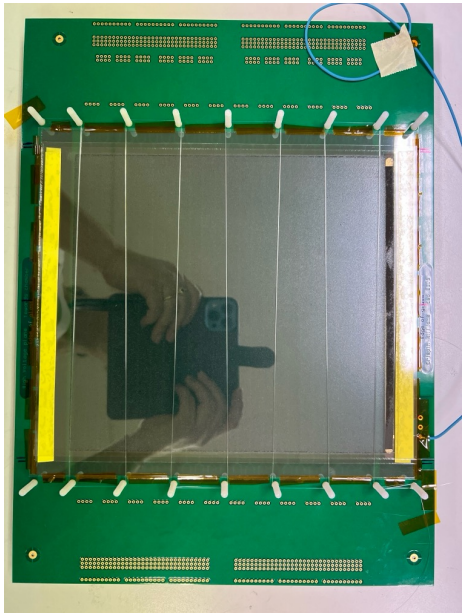
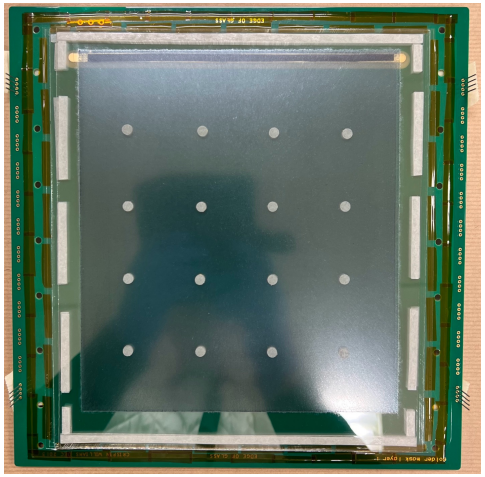
MRPCs

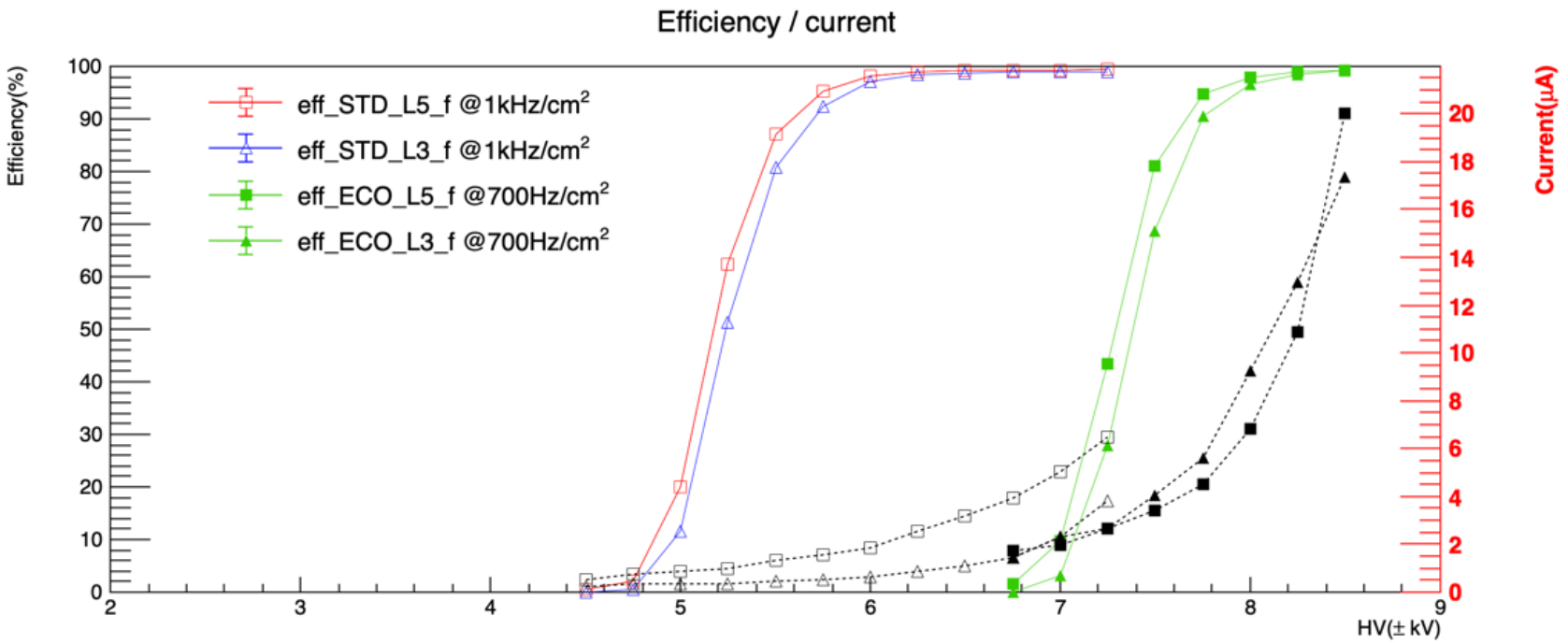
- MRPCs
  - LRG3(tested, 234 μm ceramic fishing line)
  - LRG5(250 μm of spacers)
  - Double stack (8 gaps)
  - Glass:
    - Resistivity: ~10^9Ωcm, 0.5 mm thickness
    - Active area: 19cm x 19cm
    - Readout strip: 7 mm wide(8 mm pitch)
- Gas:
  - Standard gas(R134a 98% + SF_6 2%)
  - Ecological gas(R1234ze 100%)
- Beam condition:
  - spot(1.5cm x 1.5cm), wide(2cm x 5cm)
- NINO + HPTDC used





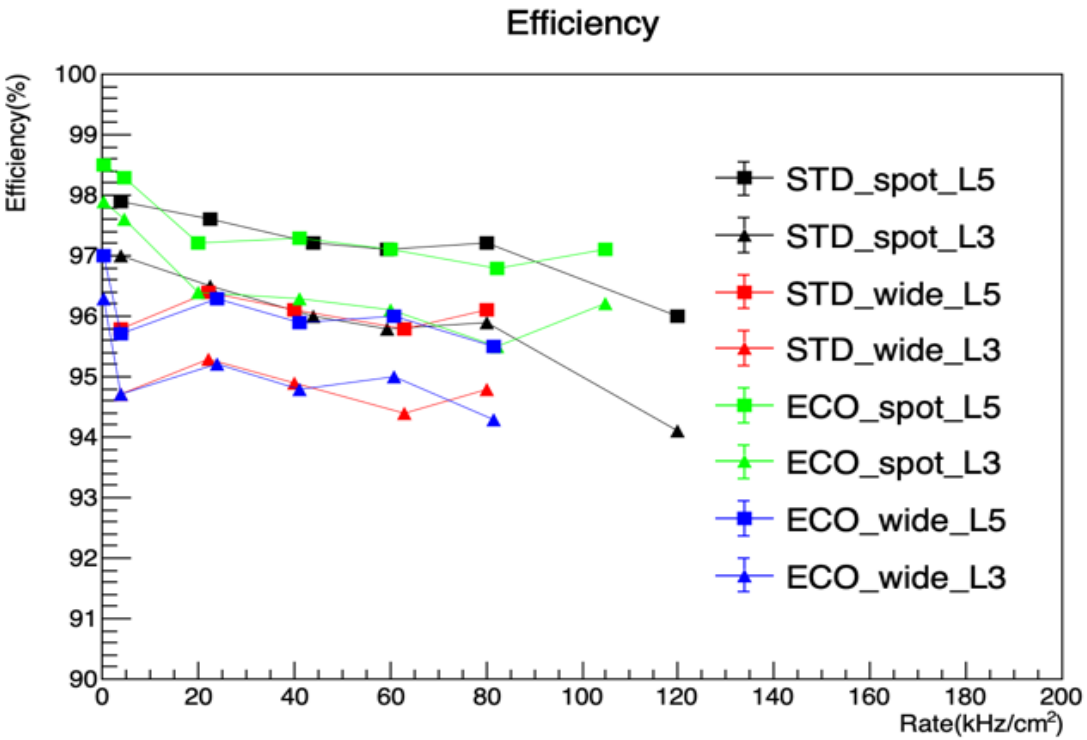
T10 beam test setup

Efficiency vs. HV



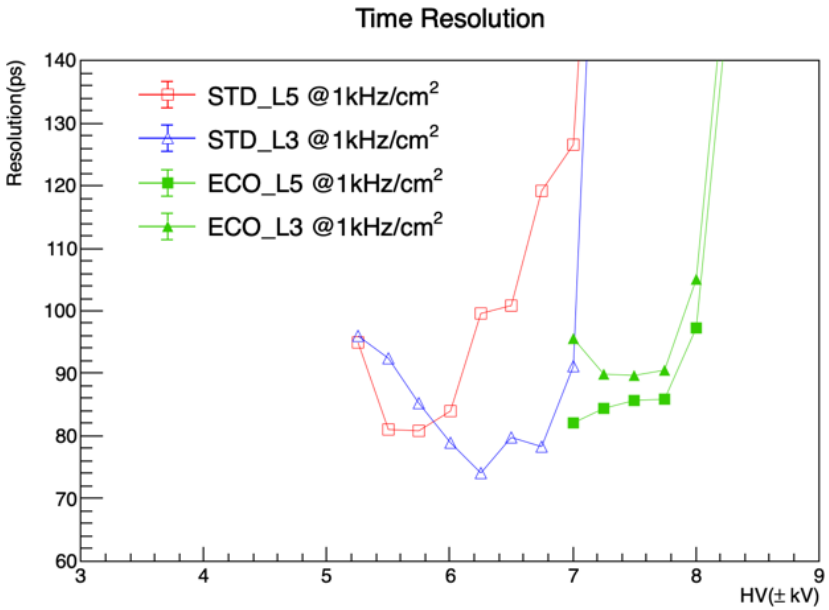
- Good efficiencies
- High dark current
  - A fast increase in the ecological gas
- Ecological gas: mixture gas study

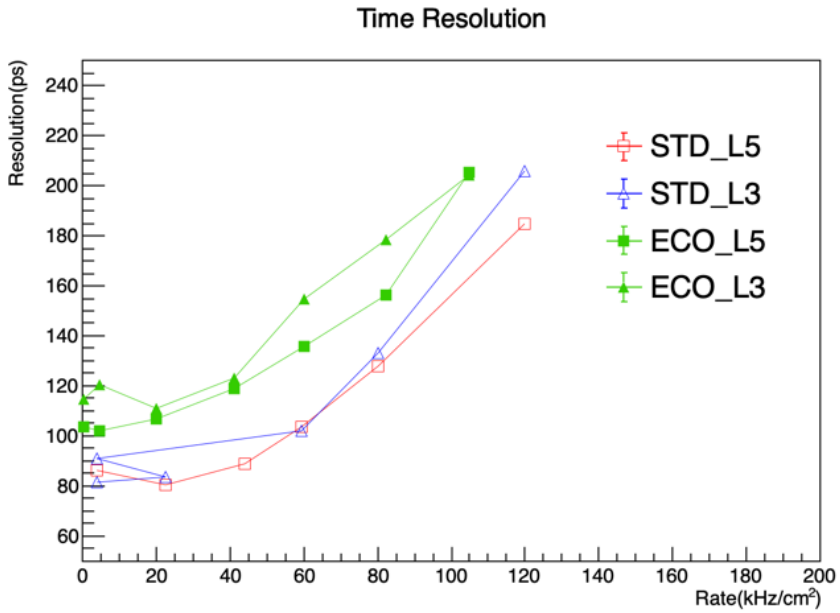
Efficiency vs. Rate



- Slightly reduced but OK up to 100 kHz/cm^2
- Small difference: Spot beam <-> wide beam
- After 80kHz/cm^2, pileup events mess up the data
  - Need a tuning for trigger setting(?)

Time resolution





- Time resolution for both gases:
  - 75 ps ~ 100 ps at a low rate
  - As the rate increases, the time resolution slowly deteriorates

Summary

- MRPCs with LRG glasses at high rates
  - Efficiency & Time resolution: as expected
  - High dark current
    - Dark current is not stable
    - Not seem to be in the gas gaps
    - Current through spacers or fishing line(?)

- Further study is needed
  - on the spacer to reduce the dark current, spacers with higher insulation
  - on the gas mixture