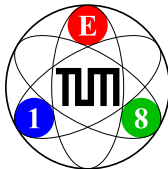# Particle ID COMPASS

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for the COMPASS collaboration

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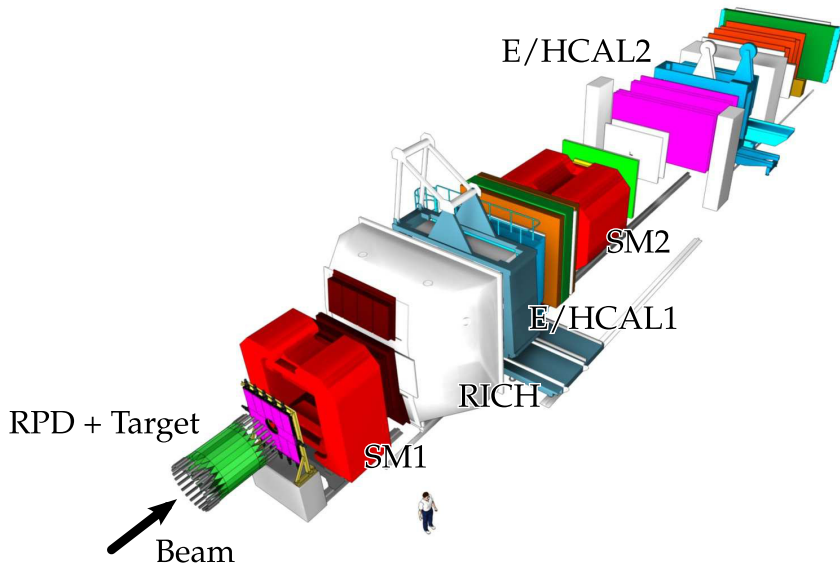
Diffractive and electromagnetic
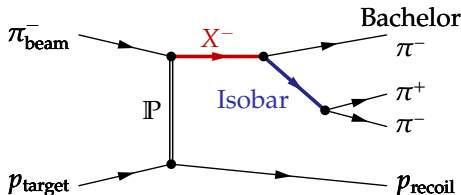processes at high energies
Bad Honnef

E/HCAL2

SM2

E/HCAL1

RICH

RPD + Target

SM1

Beam

- Pion-hypothesis:
  "*Every charged track is a pion*"

- Three types of contaminations:

- Pion-hypothesis:
  "*Every charged track is a pion*"

- Three types of contaminations:

  ▸ Free K^- decay near the target:

- Pion-hypothesis:
  "*Every charged track is a pion*"

- Three types of contaminations:

  - Free K^- decay near the target:
    Kinematically suppressed
    $m_{3\pi} > 0.5 GeV/c^2$ plus CEDAR

- Pion-hypothesis:
  "*Every charged track is a pion*"

- Three types of contaminations:

  - Free K^- decay near the target:
    Kinematically suppressed
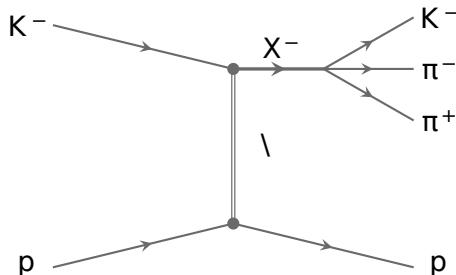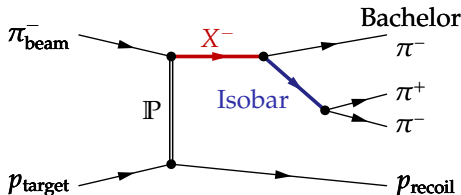 $m_{3\pi} > 0.5 GeV/c^2$ plus CEDAR

  - Diffractive K^- dissociation:

- Pion-hypothesis:
  "*Every charged track is a pion*"

- Three types of contaminations:

  ► Free K^- decay near the target:
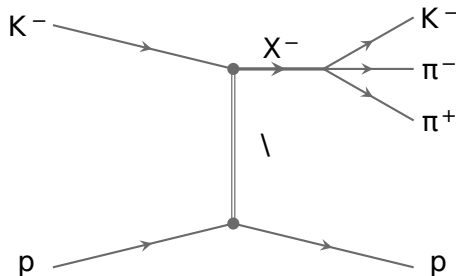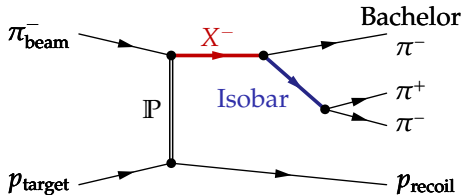   Kinematically suppressed
    $m_{3\pi} > 0.5 GeV/c^2$ plus CEDAR

  ► Diffractive K^- dissociation:
    CEDAR and RICH
    (Also e.g. e^-)

- Pion-hypothesis:
  "*Every charged track is a pion*"

- Three types of contaminations:

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    $m_{3\pi} > 0.5 GeV/c^2$ plus CEDAR

  ▸ Diffractive K^- dissociation:
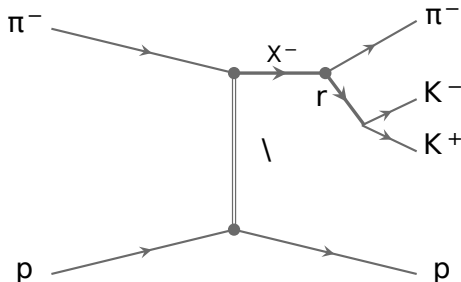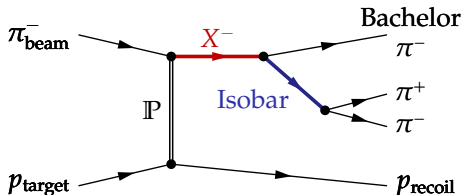   CEDAR and RICH
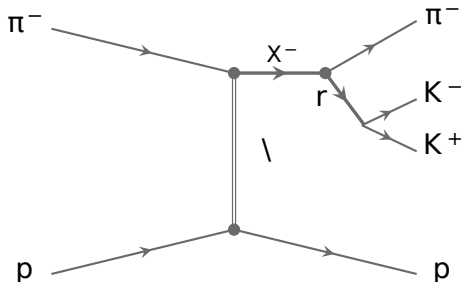   (Also e.g. e^-)

  ▸ $K^+ K^-$ pair production:

- Pion-hypothesis:
  "*Every charged track is a pion*"

- Three types of contaminations:

  - Free K^- decay near the target:
    Kinematically suppressed
    $m_{3\pi} > 0.5 GeV/c^2$ plus CEDAR

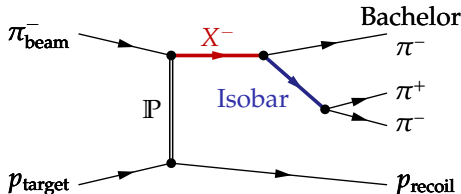 - Diffractive K^- dissociation:
    CEDAR and RICH
    (Also e.g. e^-)

  - $K^+ K^-$ pair production:
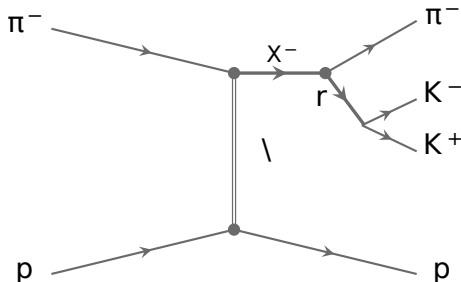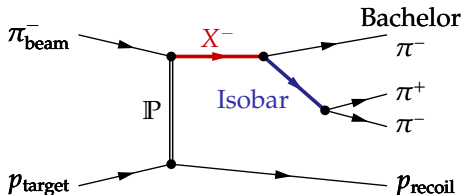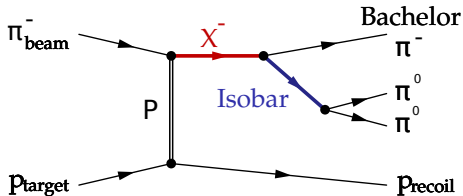   RICH: K^+

- Pion-hypothesis:
  "*Every charged track is a pion*"

- Three types of contaminations:

  - Free K^- decay near the target:
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    $m_{3\pi} > 0.5 GeV/c^2$ plus CEDAR

  - Diffractive K^- dissociation:
    CEDAR and RICH
    (Also e.g. e^-)

  - K^+K^- pair production:
    RICH: K^+

- PID not very important in this channel

- Not two neutral particles π^0

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- Decay to $\pi^0 \to \gamma\gamma$

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- Decay to $\pi^0 \to \gamma\gamma$

- Actually measure:
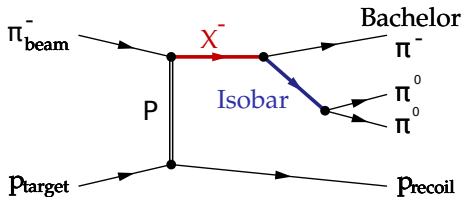 $\pi^- p \to \pi^- \gamma\gamma\gamma\gamma p$
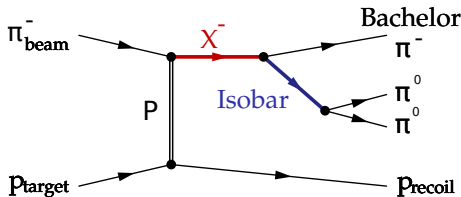
- Not two neutral particles π^0

- Decay to $\pi^0 \to \gamma\gamma$

- Actually measure:
  $\pi^- p \to \pi^- \gamma\gamma\gamma\gamma p$

- γ as energy in the
  electromagnetic calorimeter
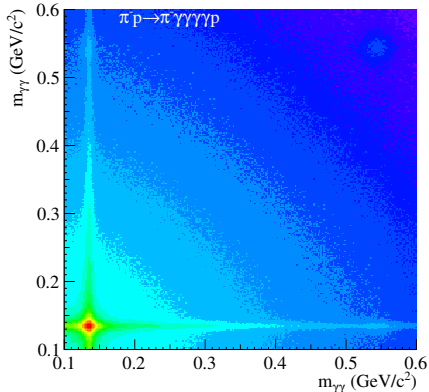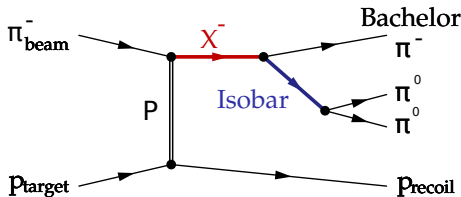
- Not two neutral particles π^0

- Decay to $\pi^0 \to \gamma\gamma$

- Actually measure:
  $\pi^- p \to \pi^- \gamma\gamma\gamma\gamma p$

- γ as energy in the electromagnetic calorimeter

- Require $m_{\gamma\gamma} \sim m_{\pi^0}$ for both pairs

Particle ID via RICH important