Dielectrons from HADES to CBM

✓ Properties of hadrons in strong int. matter: M, Γ vs ρ, m_B, T, V

SIS / GSI accelerator facility :heavy ion, proton, pion beams

$0 \leq \rho \leq 3\,\rho_0 \quad 0 \leq T \leq 80$ MeV

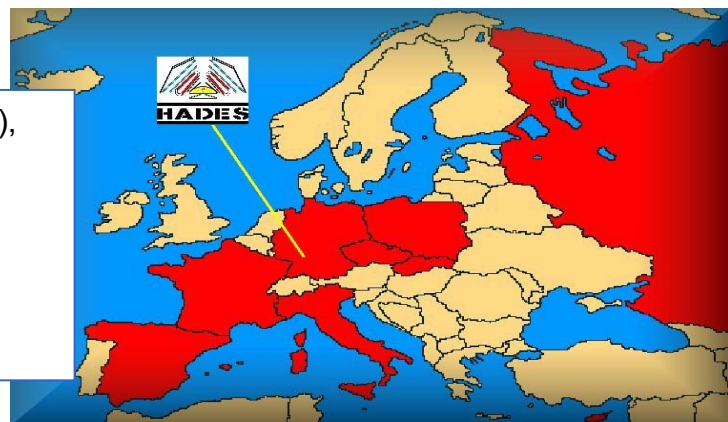
Vector meson ρ, ω, ϕ spectral functions measurements

✓ Hadron's structure: em form-factors, vector meson-nucleon,interactions

Dalitz and two-body decays, pN, πN reactions

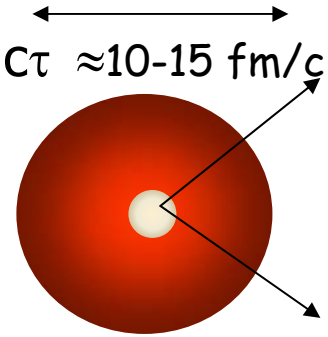
dielectrons !

Bratislava (SAS, PI), Catania (INFN - LNS), Cracow (Univ.), Darmstadt,(GSI), Dresden (FZR), Dubna (JINR), Frankfurt (Univ.),Giessen (Univ.), Milano (INFN, Univ.), Moscow (ITEP, INR, MEPhI), Munich (Tech. Univ.), Nicosia (Univ.), Orsay (IPN),Rez (CAS, NPI), Sant. de Compostela (Univ.), Valencia (Univ.)

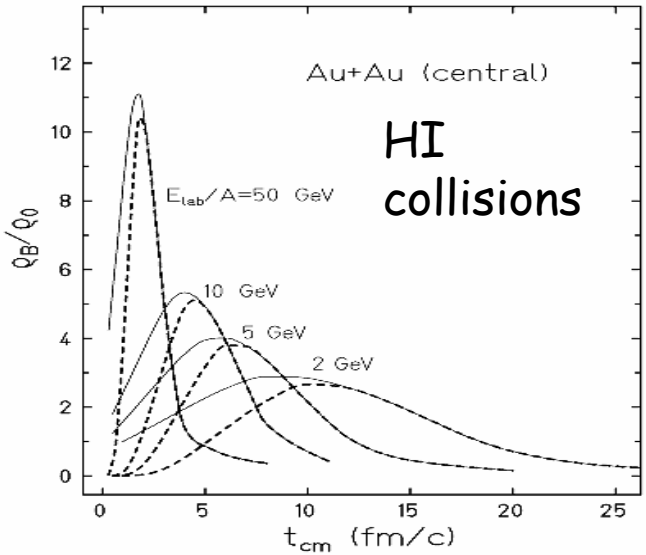


Dielectrons: sensing probe

✓ **dielectron two-body decays**



		BR ! !
ρ	1.3fm	4.4×10^{-5}
ω	23fm	7.1×10^{-5}
ϕ	44fm	3.1×10^{-5}



$$m_{e+e-} = 2\sqrt{p_{e+}p_{e-}}\sin\frac{\vartheta_{e+e-}}{2}$$

..and Dalitz decays

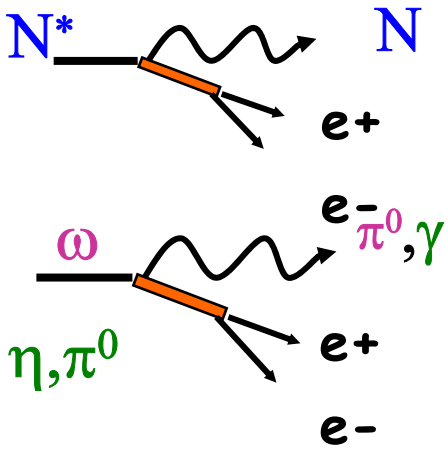
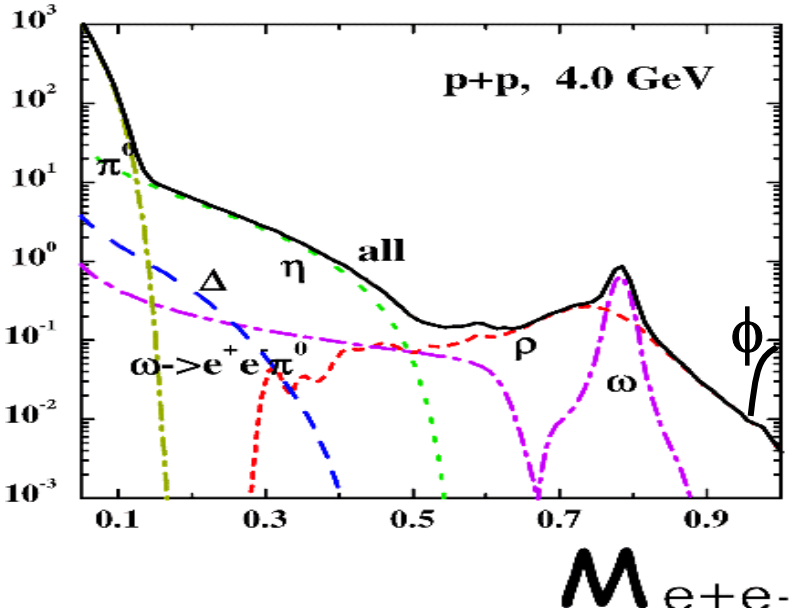
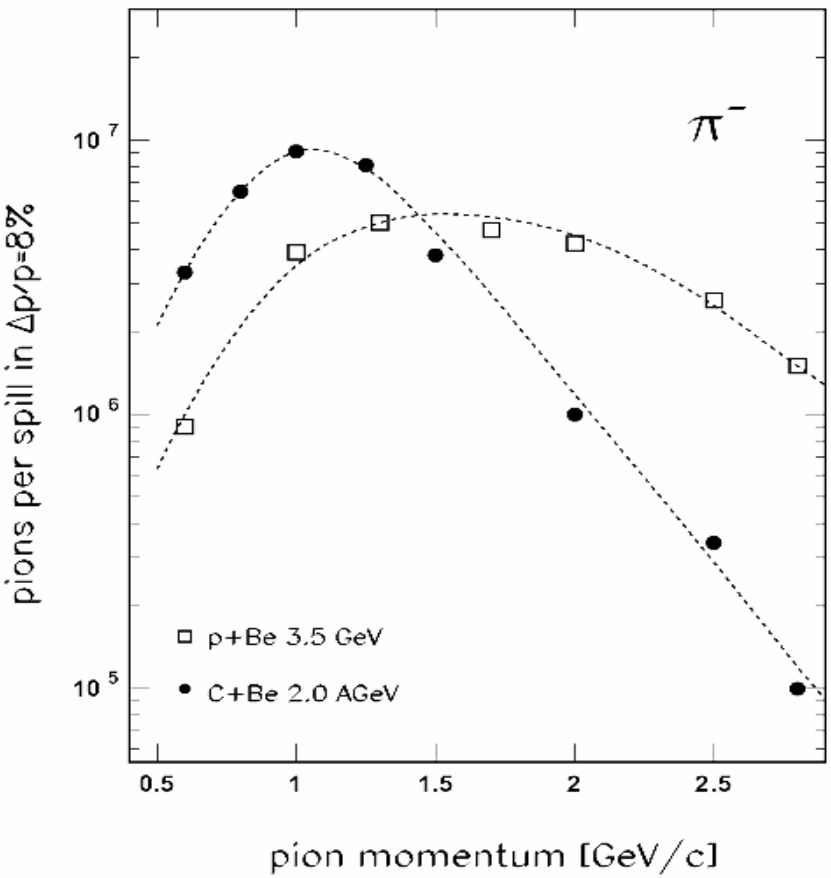


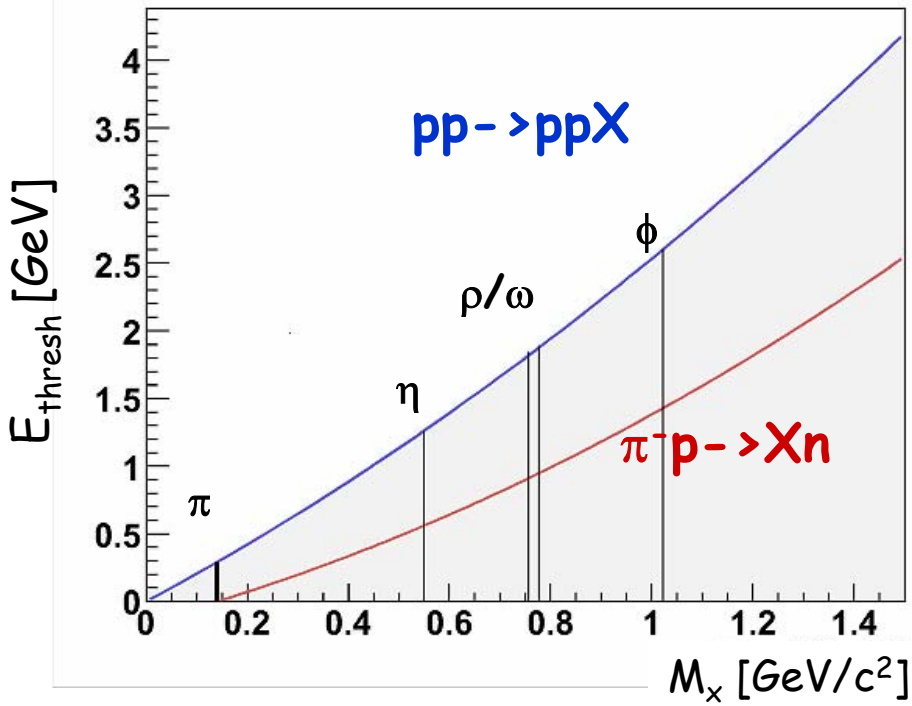
Figure of merit



Beams@GSI for HADES

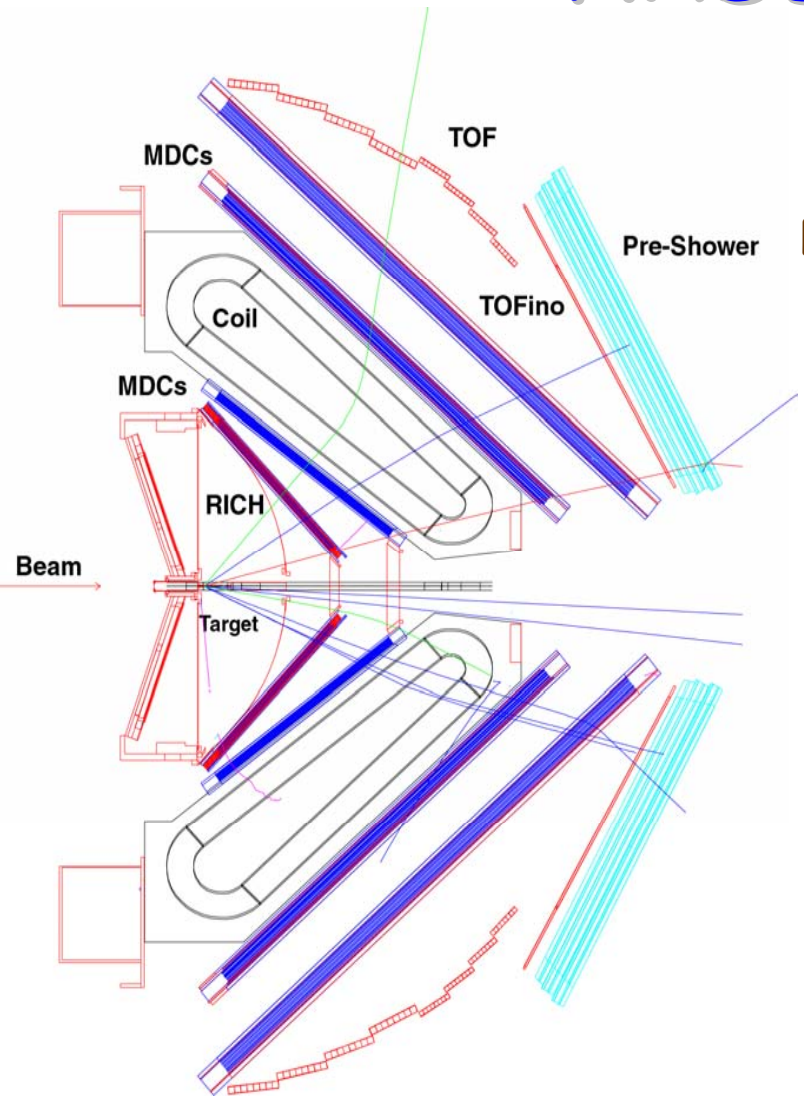
- ✓ HI beams with E≤2 AGeV
- ✓ p beam with I<10^{11} E<4.6 GeV
- ✓ secondary π beams

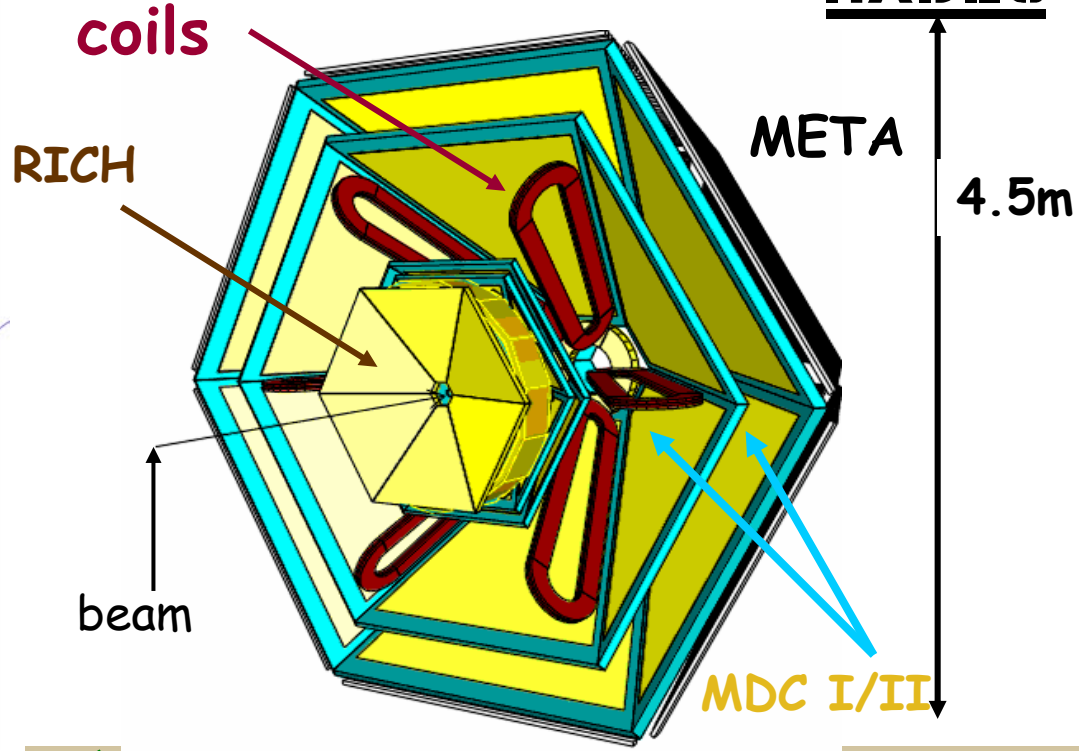




- ✓ study elementary dielectron sources from pN and πN reactions
- ✓ Study in-medium vector meson properties in pA, πA reactions

HADES@GSI



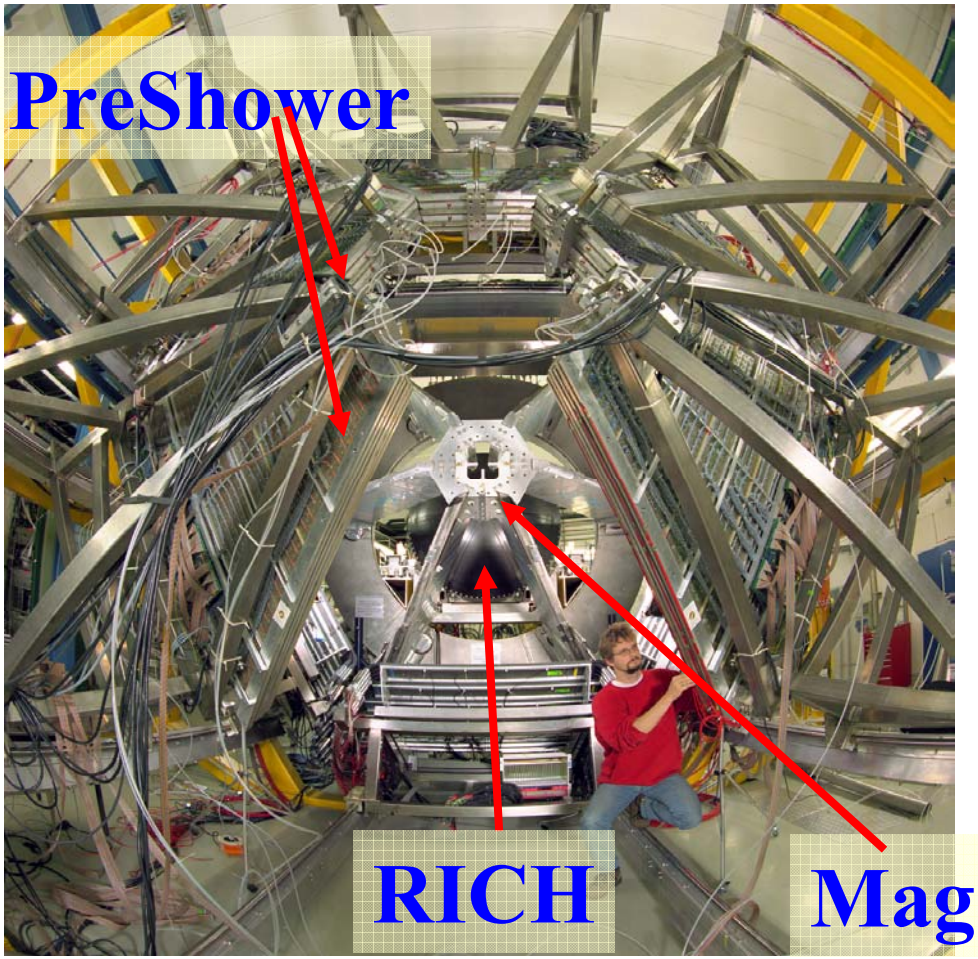


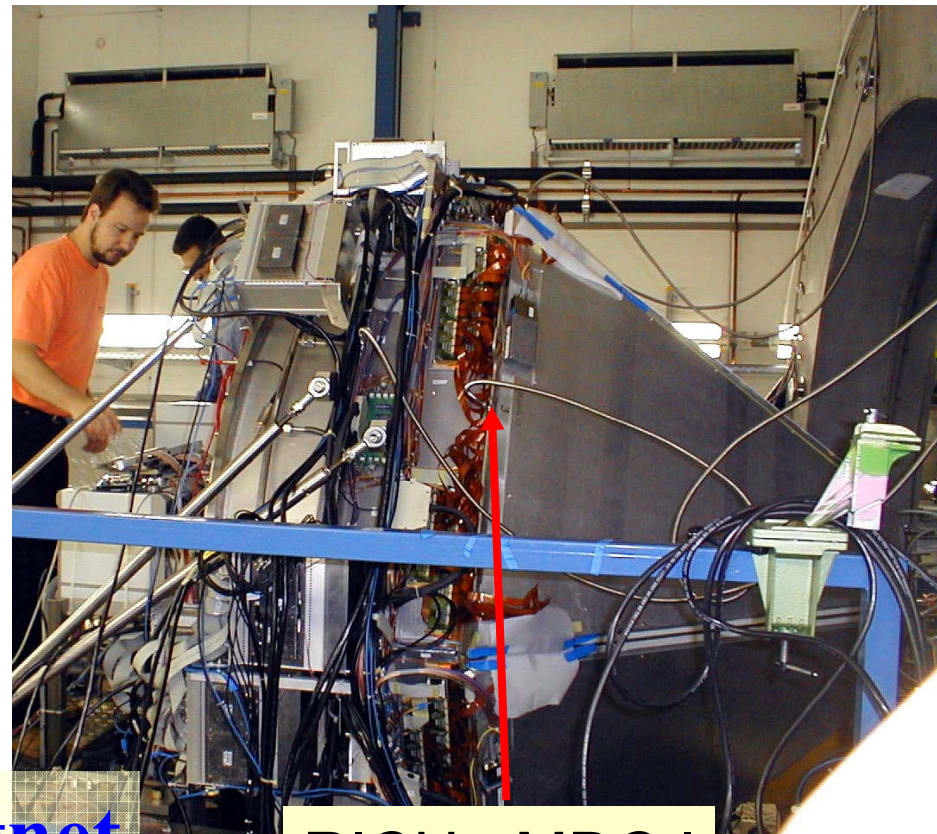
- ✓ Large acceptance : $20^0 < \theta < 80^0$, $0 < \phi < 2\pi$

≈35% for pairs ($m > 0.2$ GeV/c^2, $p_T > 0.1$ GeV/c)

- ✓ e^-, e^+, p, π identification
- ✓ real-time lepton triggering
- ✓ ΔM=1-2% @ ρ/ω (2003->)
- ✓ operation with p, π, HI beams (<2AGeV)

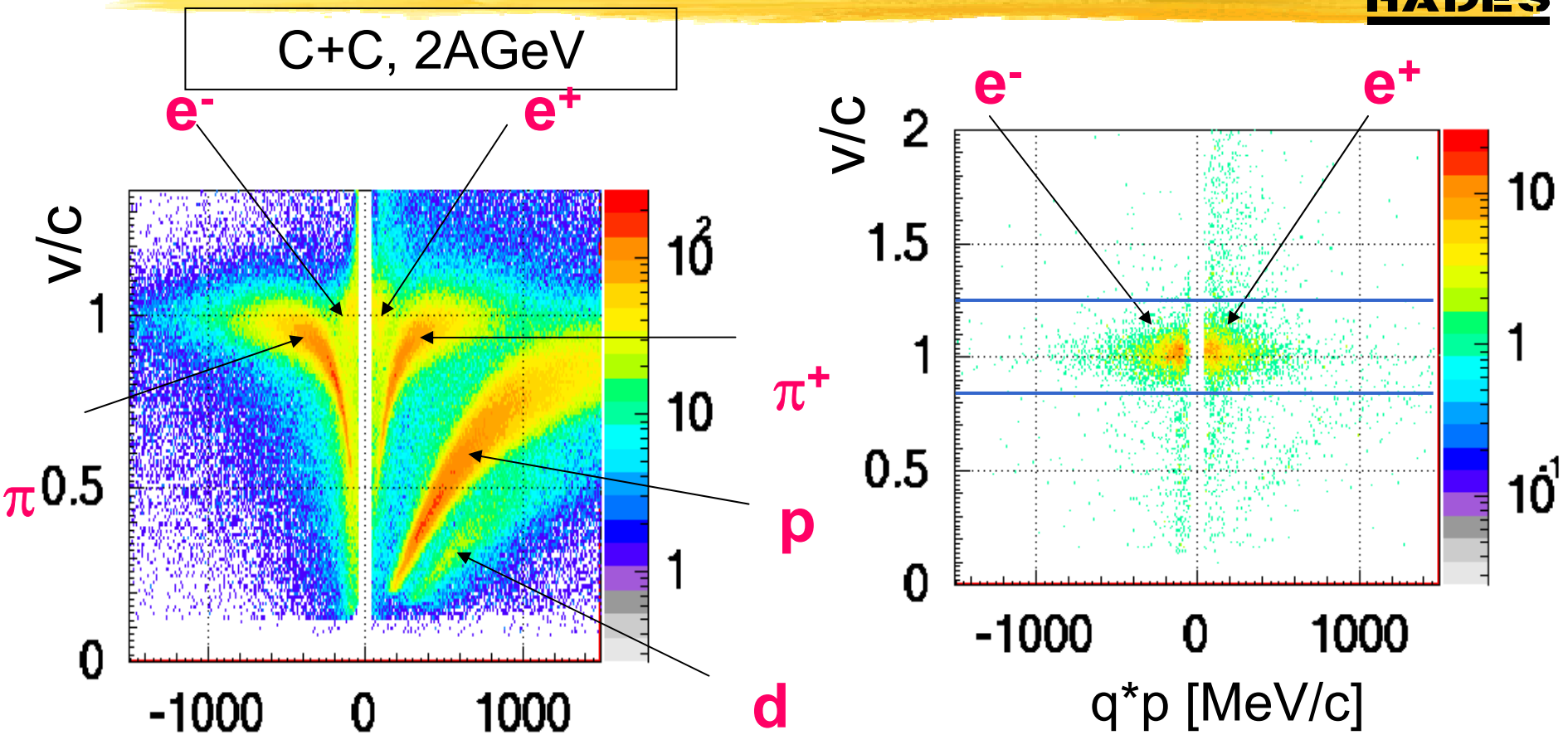
HADES in reality





RICH +MDC I

Electron identification



RICH +Tracking +TOF/PreShower

✓ hadron contamination <1%

Tracking+TOF

✓ p/π separation for p <1000 MeV/c

HADES electron trigger

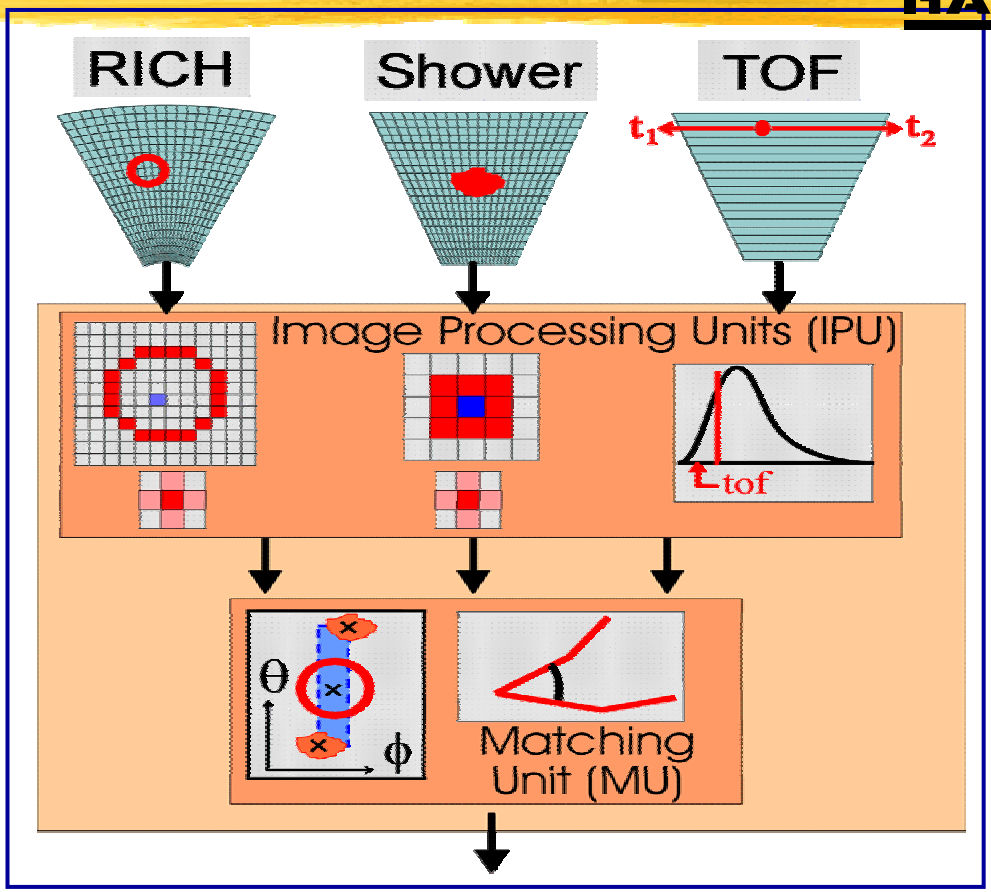
I First Level Trigger:

✓ TOF multiplicity (M_{ch}>3)

II Second Level Trigger

Identification of electron candidates

- ✓ Cherenkov rings
- ✓ Shower hits
- ✓ Time-of-flight



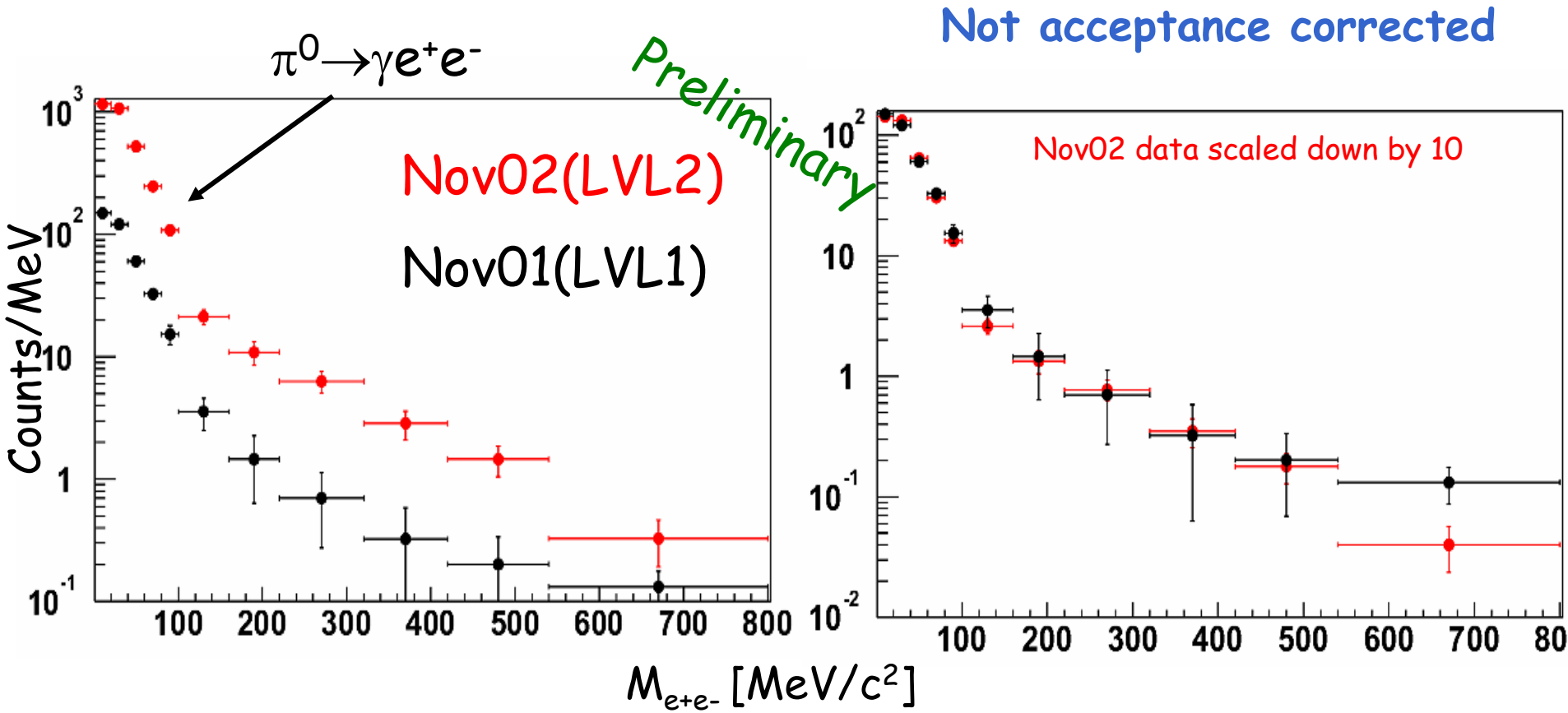
Trigger Condition: 1 electron : (1 ring matched by TOF / Shower)
Event Suppression:
only 8% selected events (LVL2)

- 60 VME boards
- decision ~ 10 µs
- process ~3 GByte/s raw data

C+C @2 AGeV

HADES

Not acceptance corrected



- ✓ 10 times more pair statistics in the same running time
- ✓ No bias on pair distributions
- ✓ High resolution tracking with outer MDC's

HADES @SIS200?: 8AGeV C+C

- Simulation of η production in C+C

	<M>/<B>	
	2AGeV	8AGeV
π	1.2*10-2	4*10-2
η	3 *10-3	3*10-2
ω	2 *10-4	2*10-2

- even without changing HADES geometry acceptance is similar