Lateral Tuning in Crack and Plug

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Introduction

Leakage effects introduce interdependence between lateral profile and absolute E/p tuning.

- Limited geometrical acceptance due to signal definition:
  - Plug: EM: 2x2, HAD: 3x3
  - Crack: EM: 3x1, HAD: 3x1
- Cannot expand signal region.

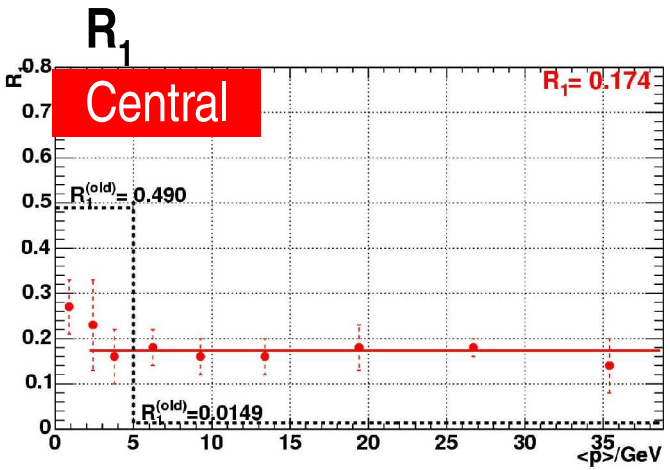
See my SGM talk of 04/06/06 for more details.

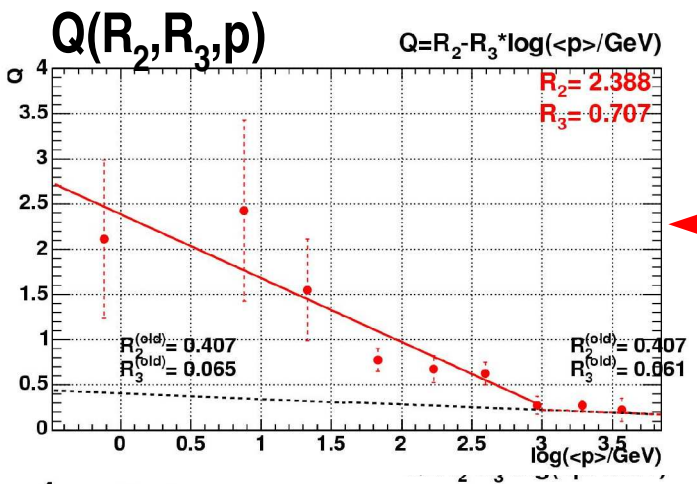
- Seperate lateral tuning for different calorimeter parts might thus become necessary.

This talk:

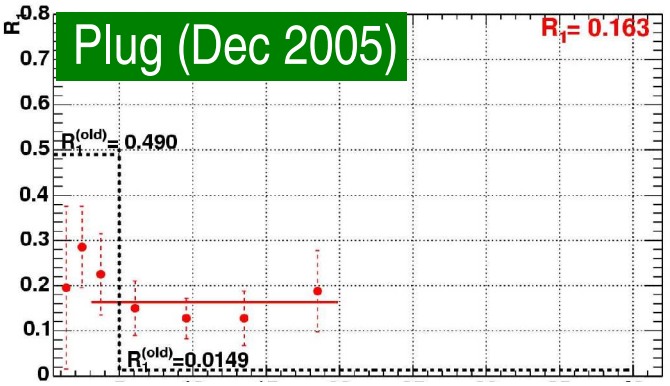
- Lateral profile tuning update in the Plug
- First tuning steps in Crack region (target towers 10+11)
- Leakage correction

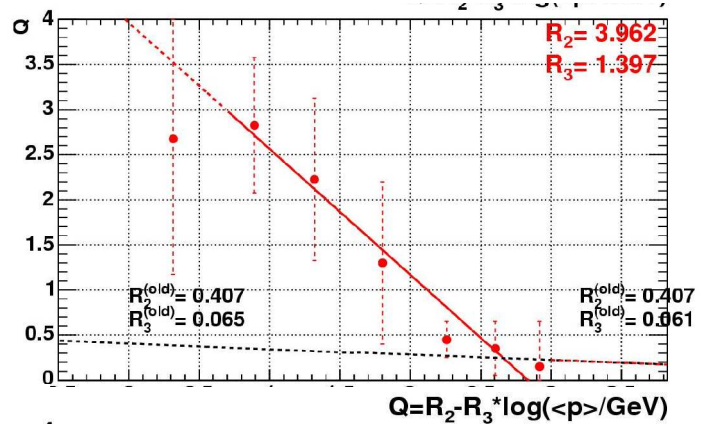
Central and Plug

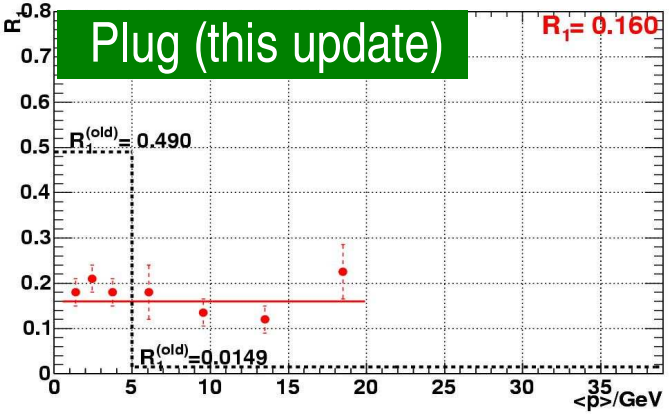


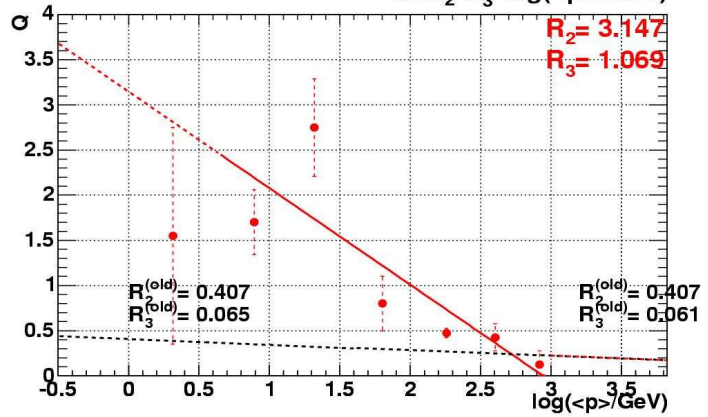


What we are currently using for all calorimeter parts.



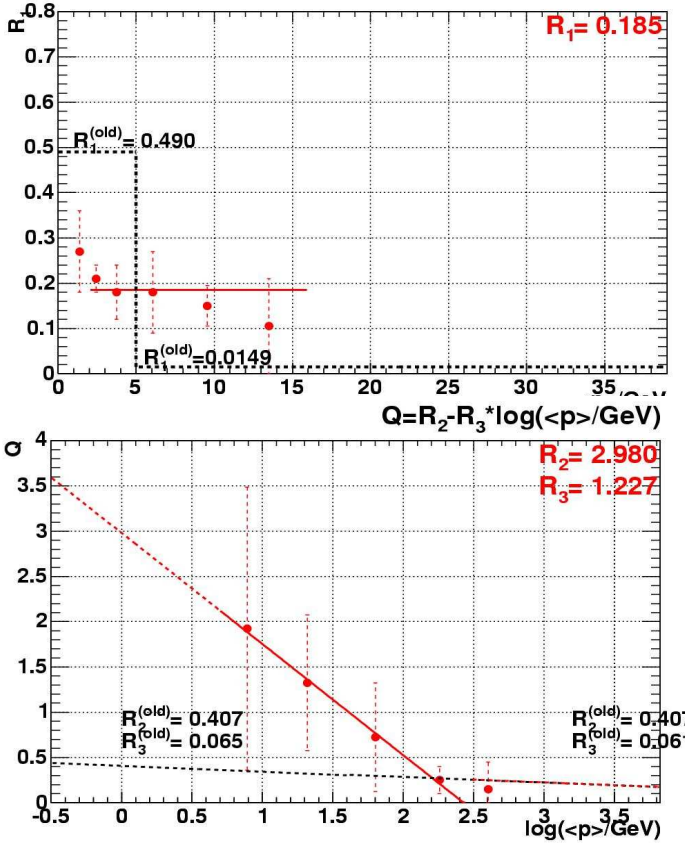




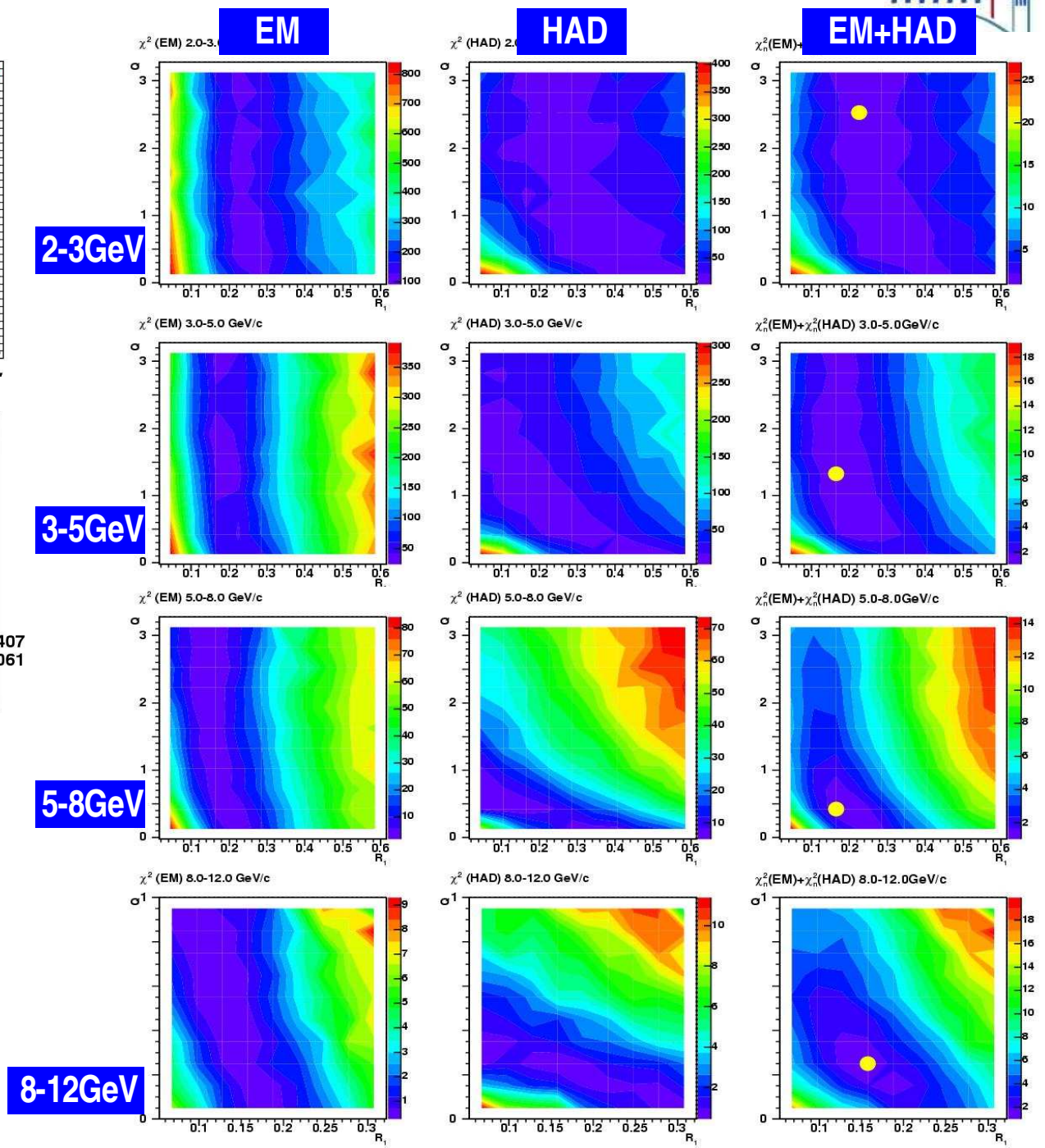


- Improved MC statistics, finer parameter grid
- Constraint for Q at low p still unsatisfactory

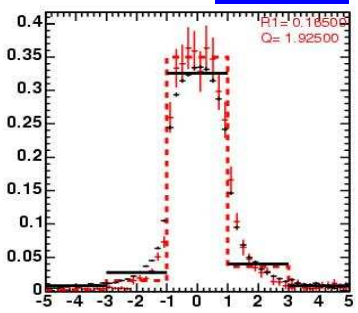
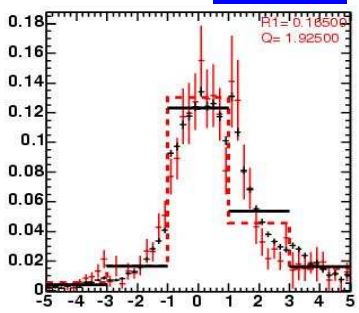
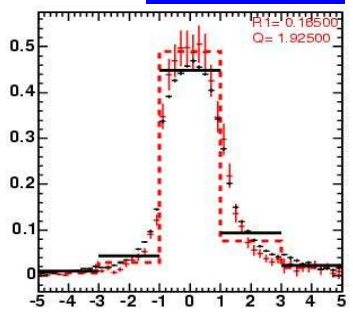
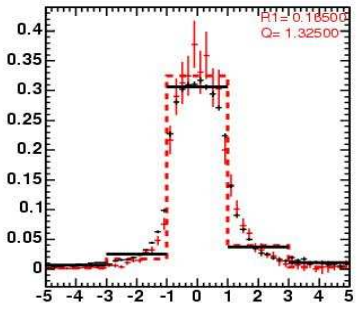
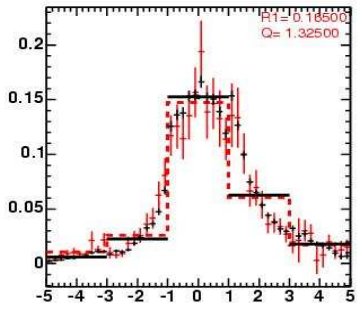
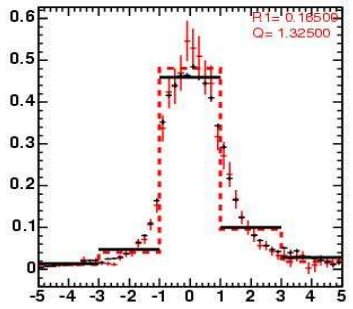
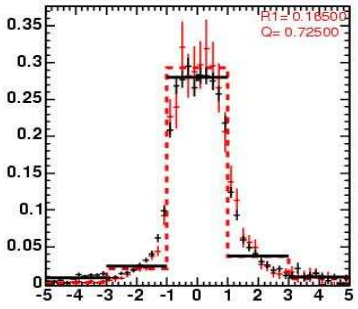
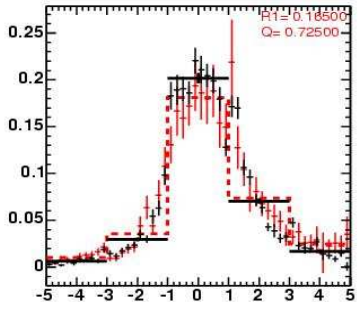
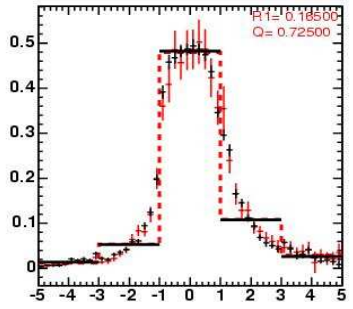
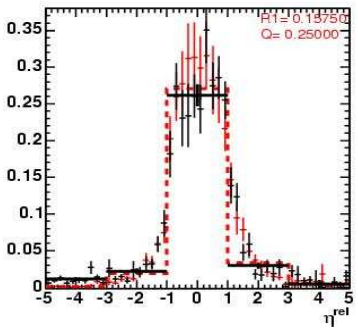
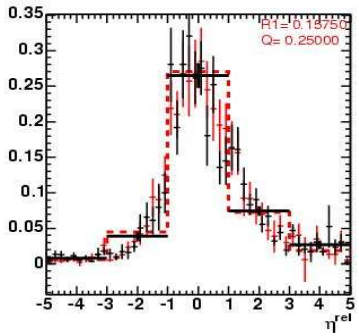
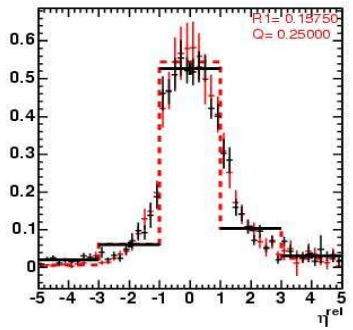
Crack: Tower 11



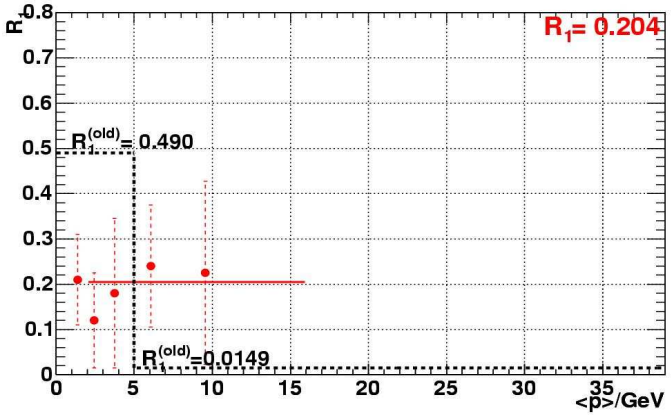
- First “low resolution” look using already existing samples (by-product from plug scan)
- Suffers from too low MC stats of tune samples!
- Tune method seems to work also here.



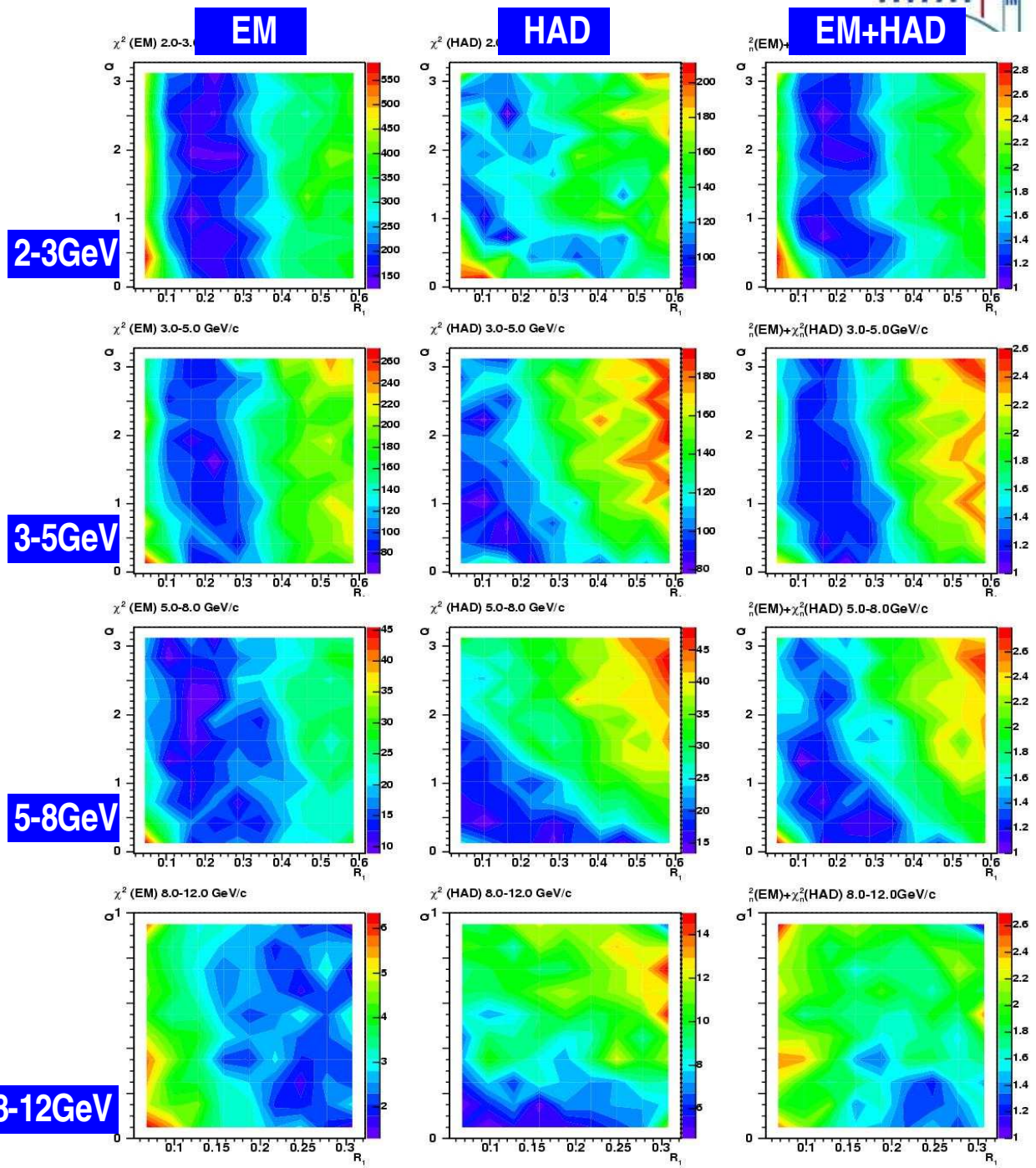
Tower 11 Profiles

	EM	HAD	TOT
2-3GeV			
3-5GeV			
5-8GeV			
8-12GeV			

Crack: Tower 10



Too poor tune sample stats, no chance to make reasonable contraint along Y axis ...



Leakage Correction

- For absolute E/p tuning we probably need a correction for remaining imperfectness of simulated lateral profiles.
- Plug: Use target towers with well contained signal and leakage regions.
  EM: (13) 14,15 HAD: 14,15

Method:

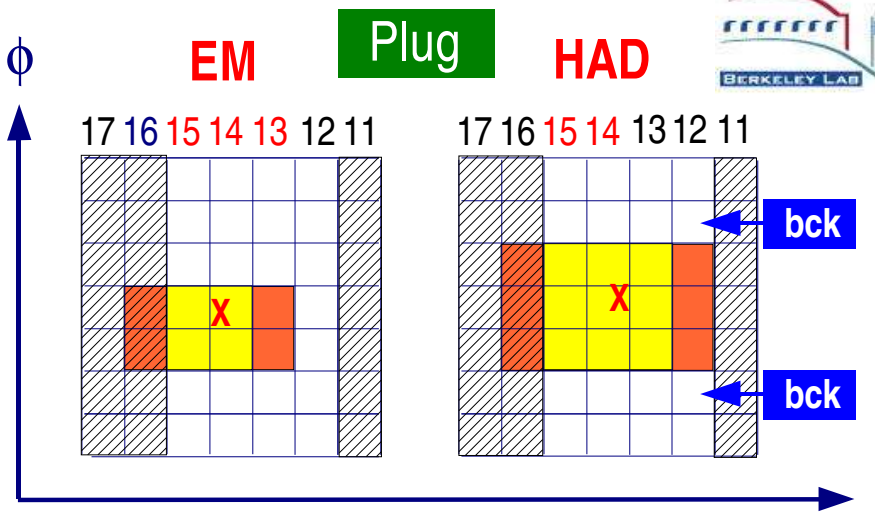
1) Correct for background

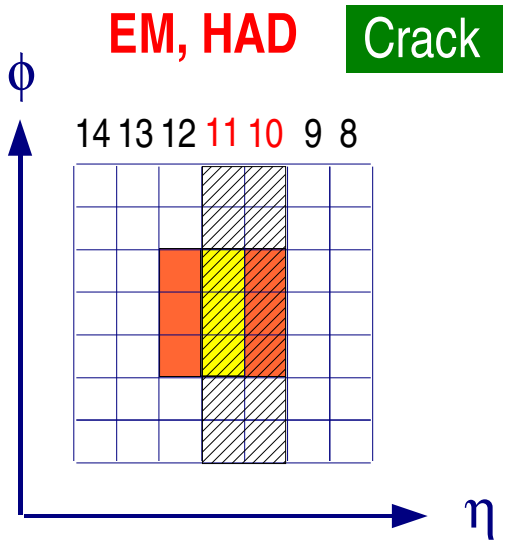
2) Calculate leakage fraction: f = S/(S+L)
   S=signal, L=leakage (adjacent towers in η)

3) Leakage correction: k=f(Data)/f(MC)

4) For tuning of FEDP/sampling fractions, use
   $\langle E/p \rangle^{cor}(p) = k(p)\ \langle E/p \rangle(p)$ (for EM and HAD)

- NB: k(p)supposed to cope with pure lateral details. Not sure if we can apply such a procedure to crack towers because of the inhomogenity of adjacent towers (effect might be different in MC and data).





signal region

leakage region

X extrapolated track impact point

Next Steps...

- Need to enlarge MC statistics for Crack region.
- New CAF attack with FAKE_EV but no minbias on top:
  - uncorrelated background not crucial for lateral profile
  - speeds up brute force parameter scan significantly
- With increasing precision it might be useful to introduce separate parametrization for Plug and Crack towers.
- Hope to derive final tune for Plug and Crack within next 1-2 weeks.
- Will re-evaluate profiles based on new parameters.
- Derive leackage corrections for remaining MC/data mismatch.