

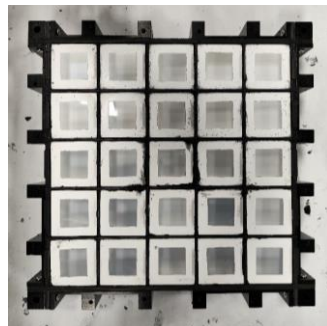
HEIC-Cube 8 layers CR test

张研硕

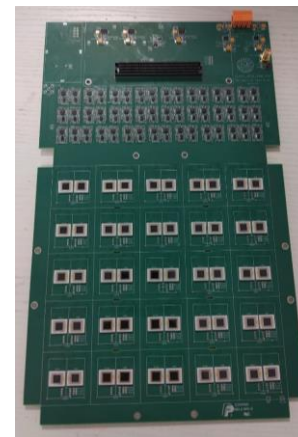
2024.04.28

宇宙线测试

新:



× 6



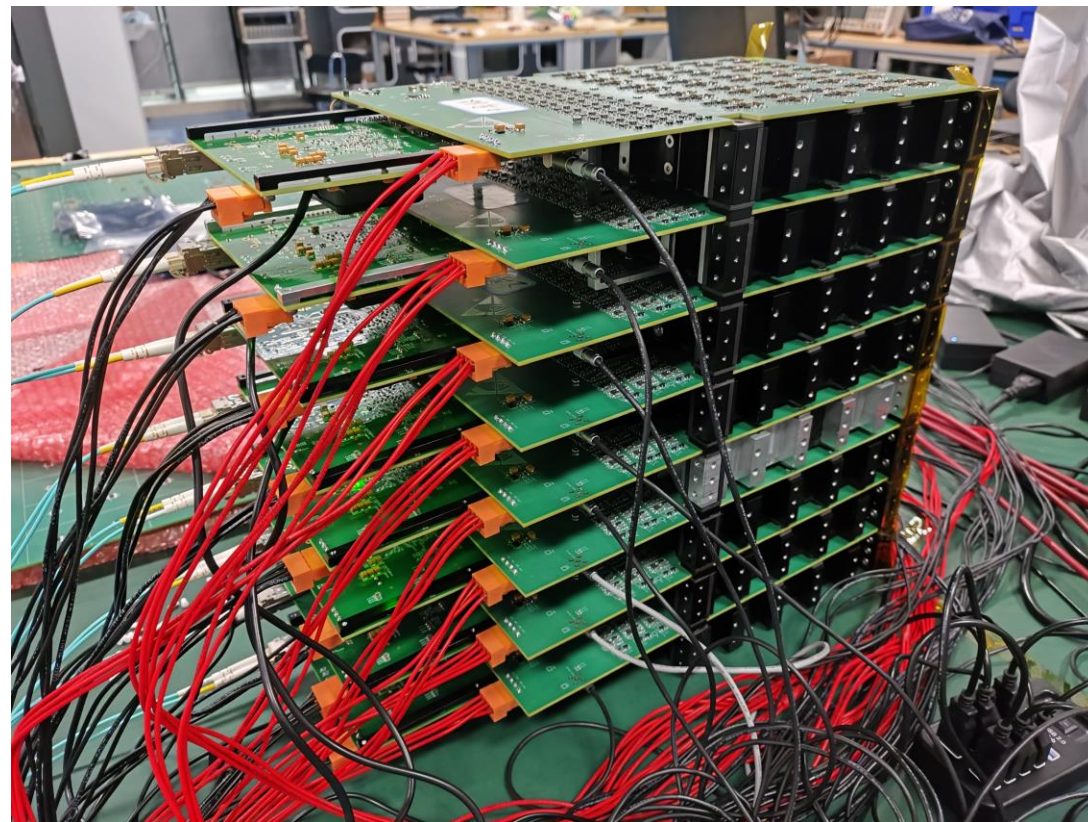
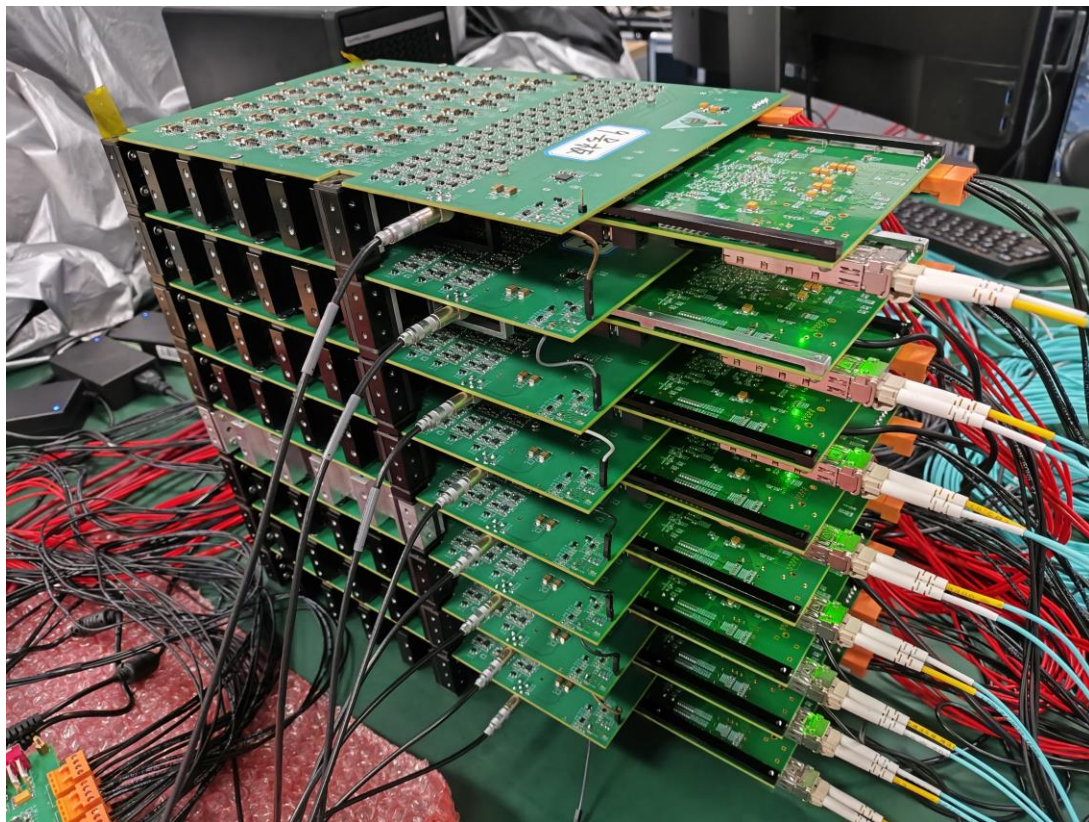
× 6

- 为 5 月份束流测试新制作了 6 层 BGO 探测层，6 块前端模拟板；与去年做好的 2 层共同组装成 8 层；
- 3 cm 边长的 BGO 晶体组成 5 行 × 5 列 × 8 层；
- 采用过阈触发模式，幅度读出方式；
- 测试时间约 28.5 小时，总共获得 2.3 GB 的二进制数据包，解包得到 76 万余个有效事例；

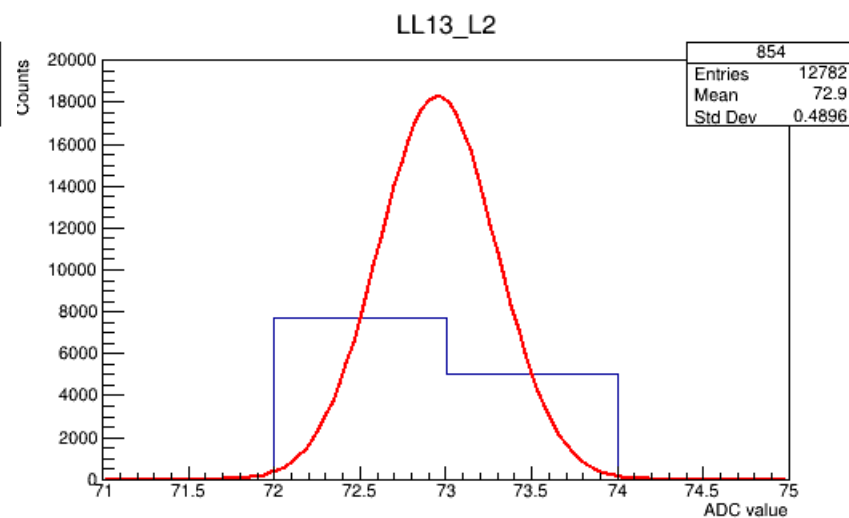
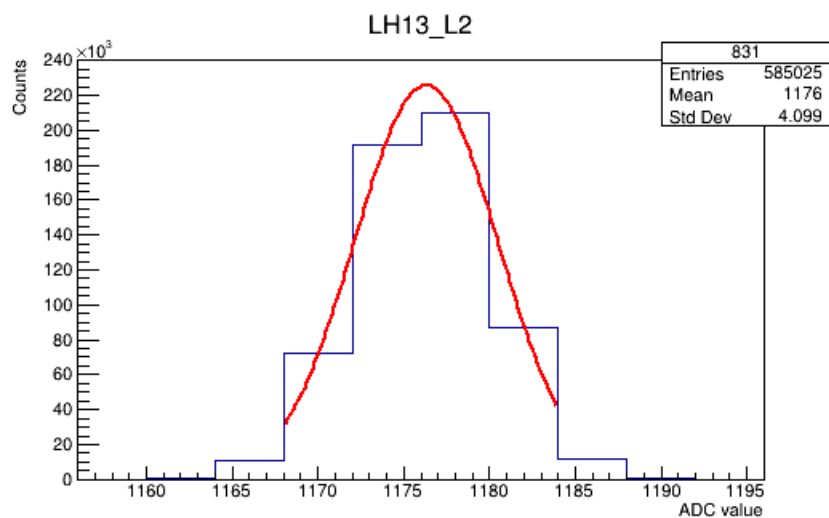
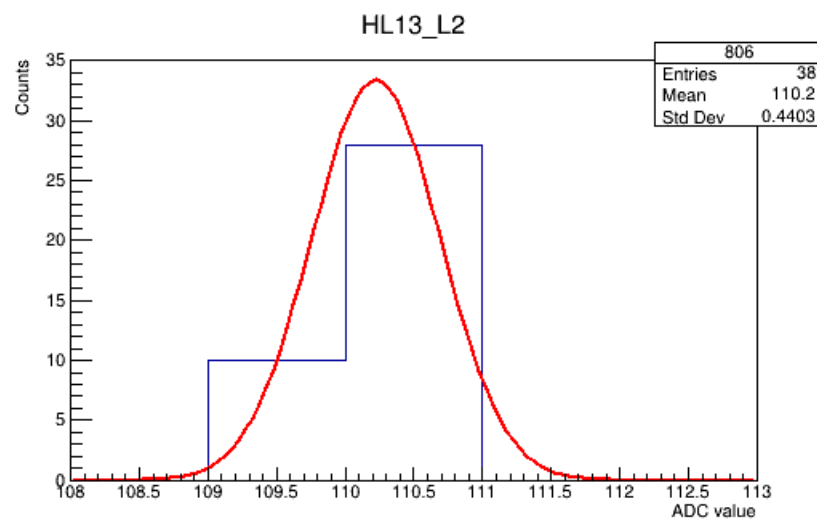
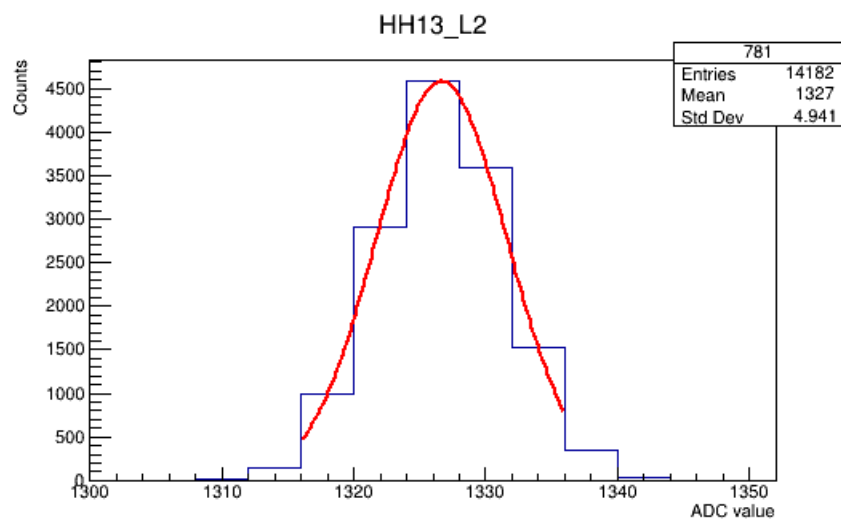
What's new

- 量能器部分变深了：仅以 10 层 BGO 晶体计，纵向深度达到了 **26.8 个辐射长度**，减小了纵向可能的泄漏；
- 前端模拟板改版：重新设计了不同增益间的连接顺序，在最大程度上减小模数转换交替采样时的串扰；
- 新开发了 **幅度读出** 的数据传输方式：与波形读出方式相比，极大地压缩了数据量，减小了传输和处理的压力；
- 重新设计了前端的上位机：页面更直观，操作更简洁，运行更稳定；

测试装置图片

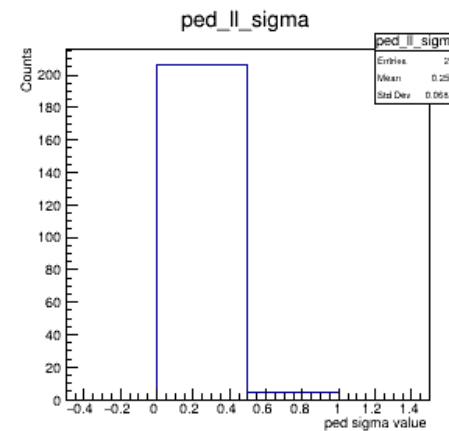
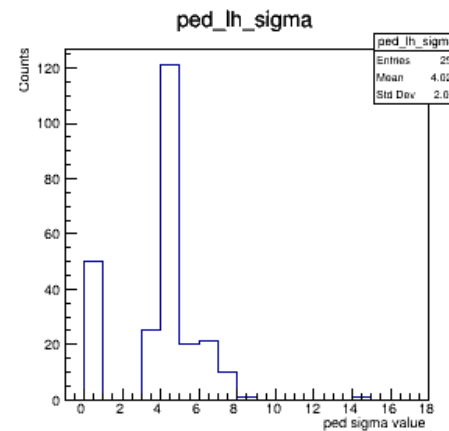
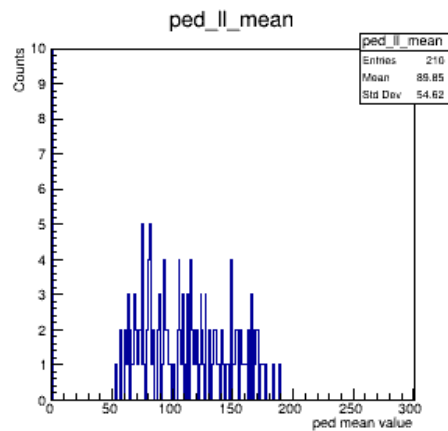
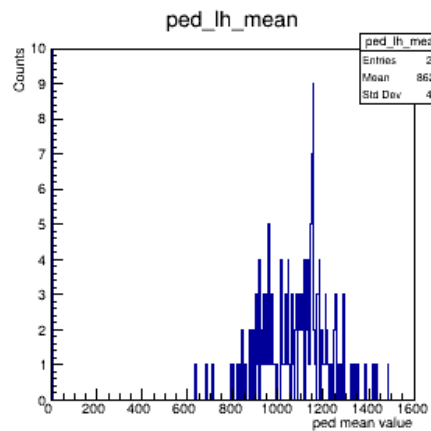
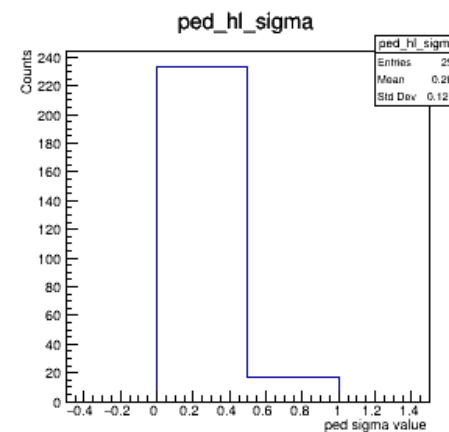
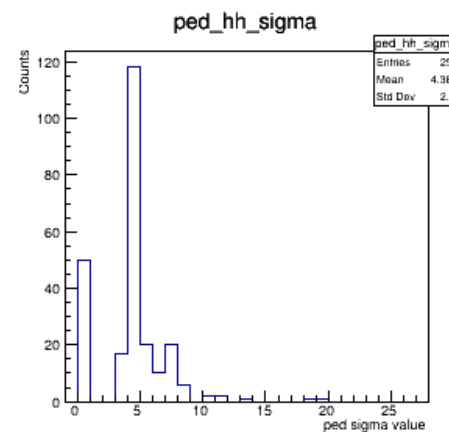
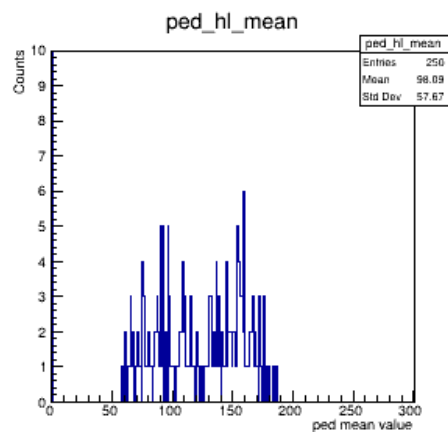
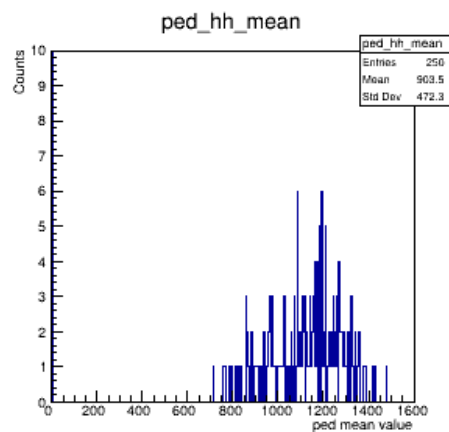


台基 典型结果



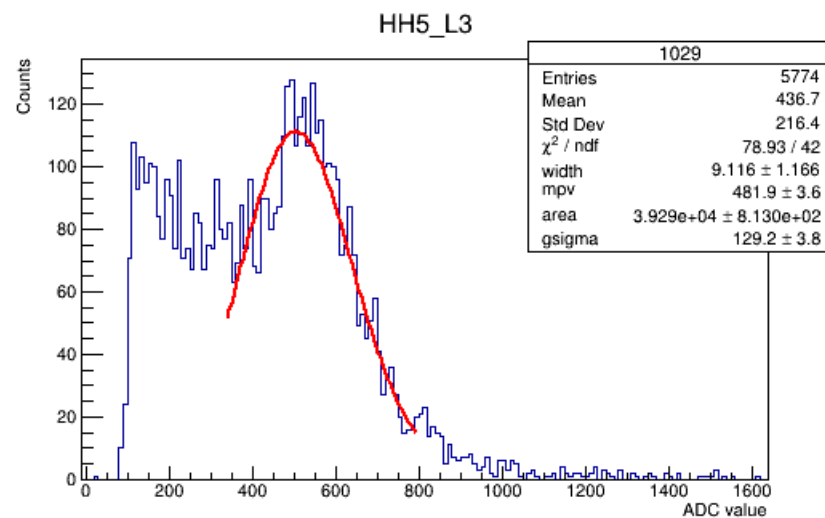
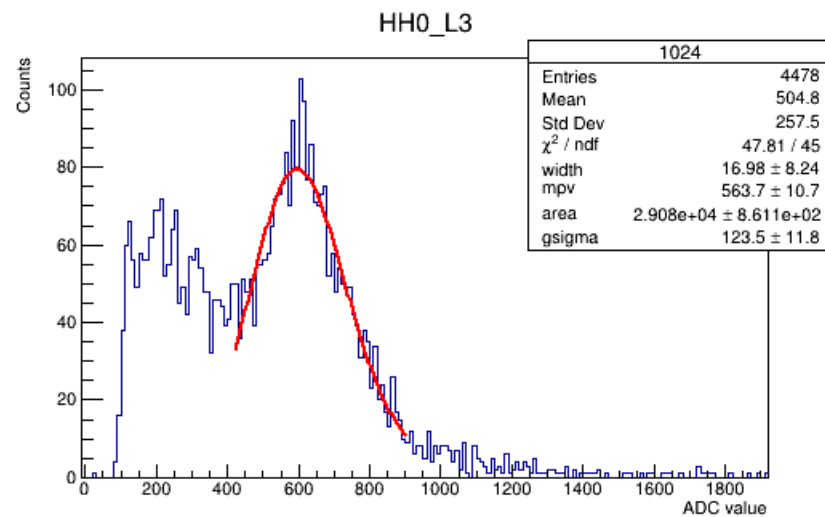
台基 汇总

高增益通道平均值 ~ 1100 ADC，标准差 ~ 5 ADC；
低增益通道平均值 ~ 120 ADC，标准差 < 0.5 ADC；

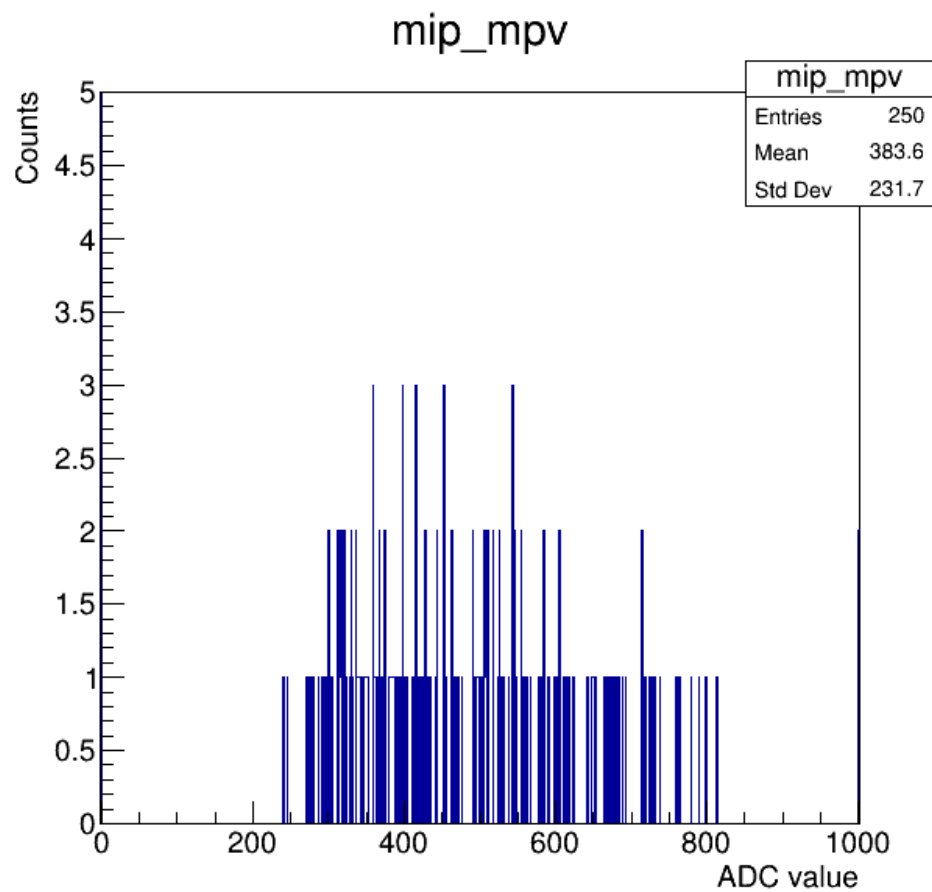


MIPs 拟合结果

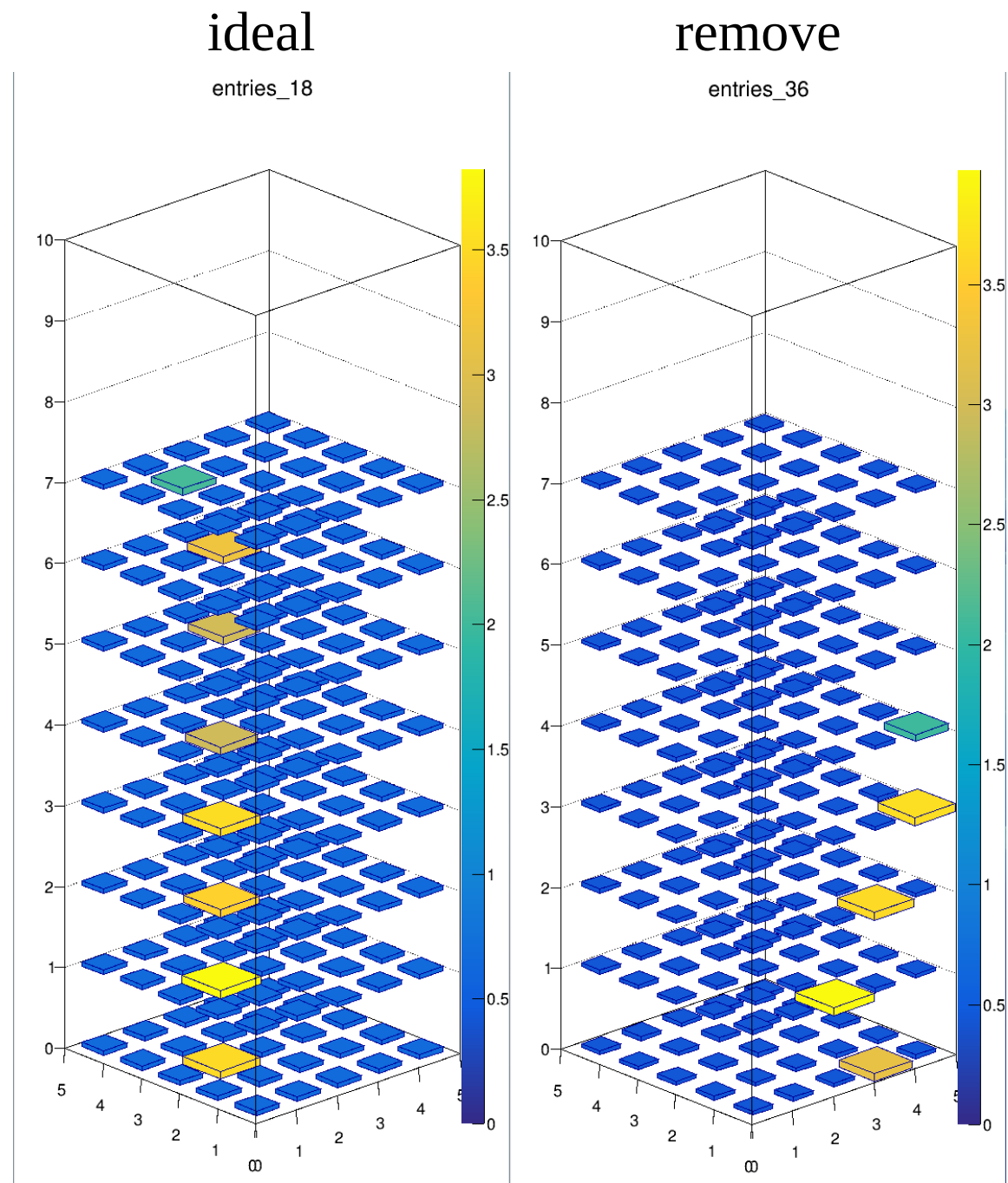
- MIPs 筛选条件:
 - 选取高增益通道 (HH + LH);
 - 每层有 1 或 2 个 通道被击中;
 - 8 层 中有 5 层及以上 有信号;



MIPs 汇总



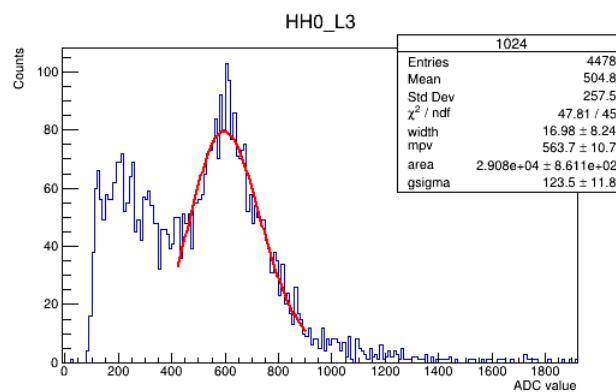
不同 BGO 晶体之间的 mpv 值 相差较大;



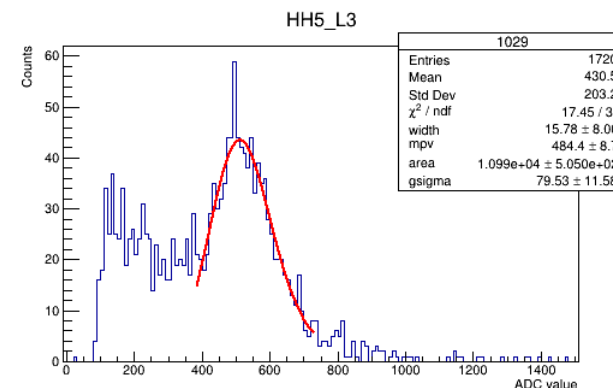
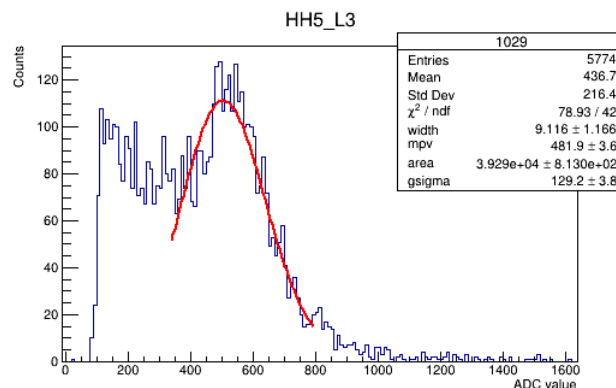
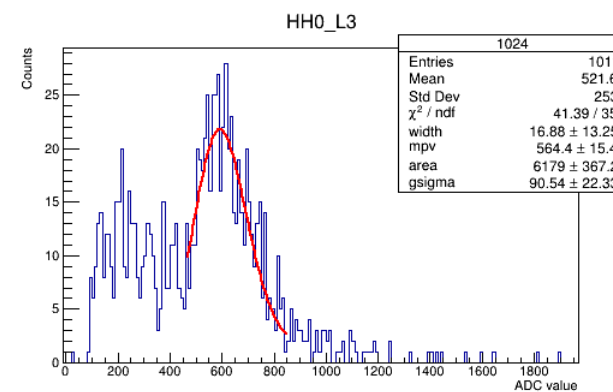
MIPs 拟合结果

- MIPs 筛选条件:
 - 选取高增益通道 (HH + LH);
 - 每层有 1 或 2 个 通道被击中;
 - 顶部 2 层中至少 1 层有信号,
底部 2 层中至少 1 层有信号;
 - 8 层 中有 5 层及以上 有信号;

P7 condition

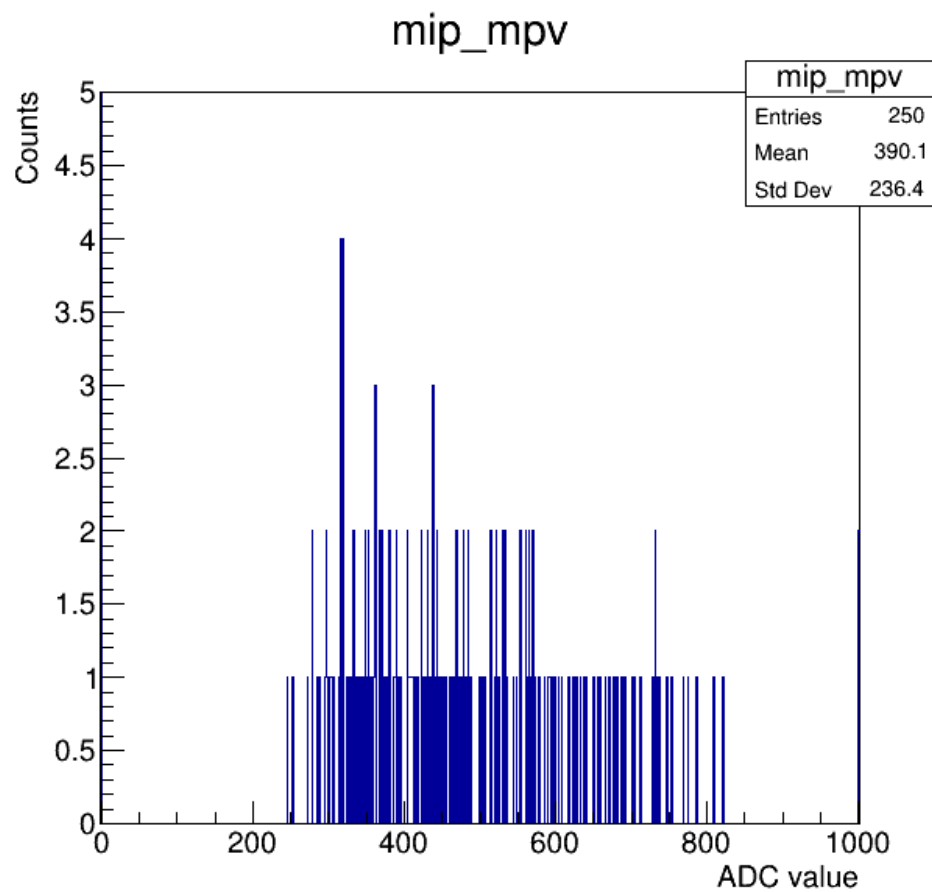


P9 condition

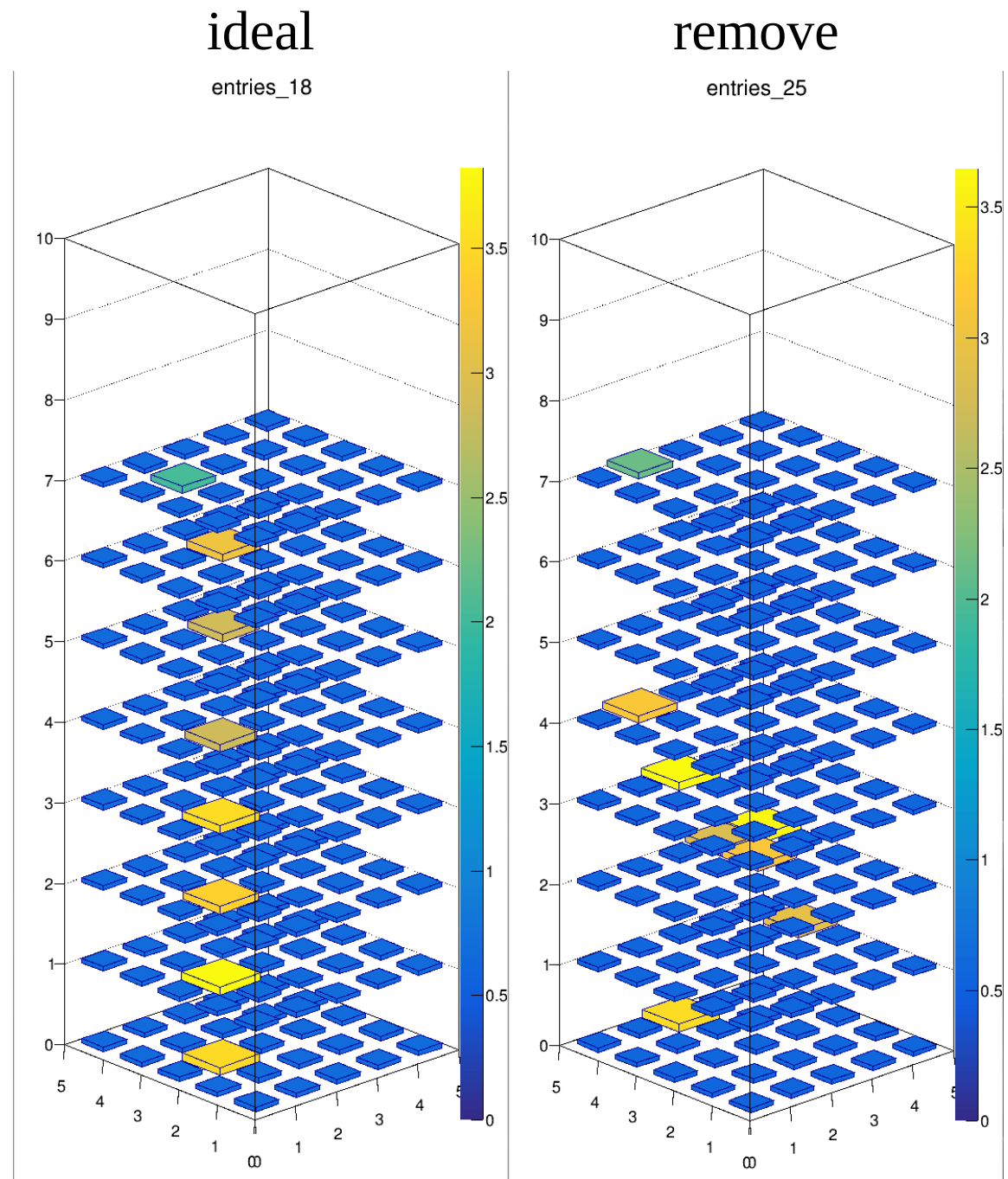


新限制条件能有效减少低 ADC 端的计数;

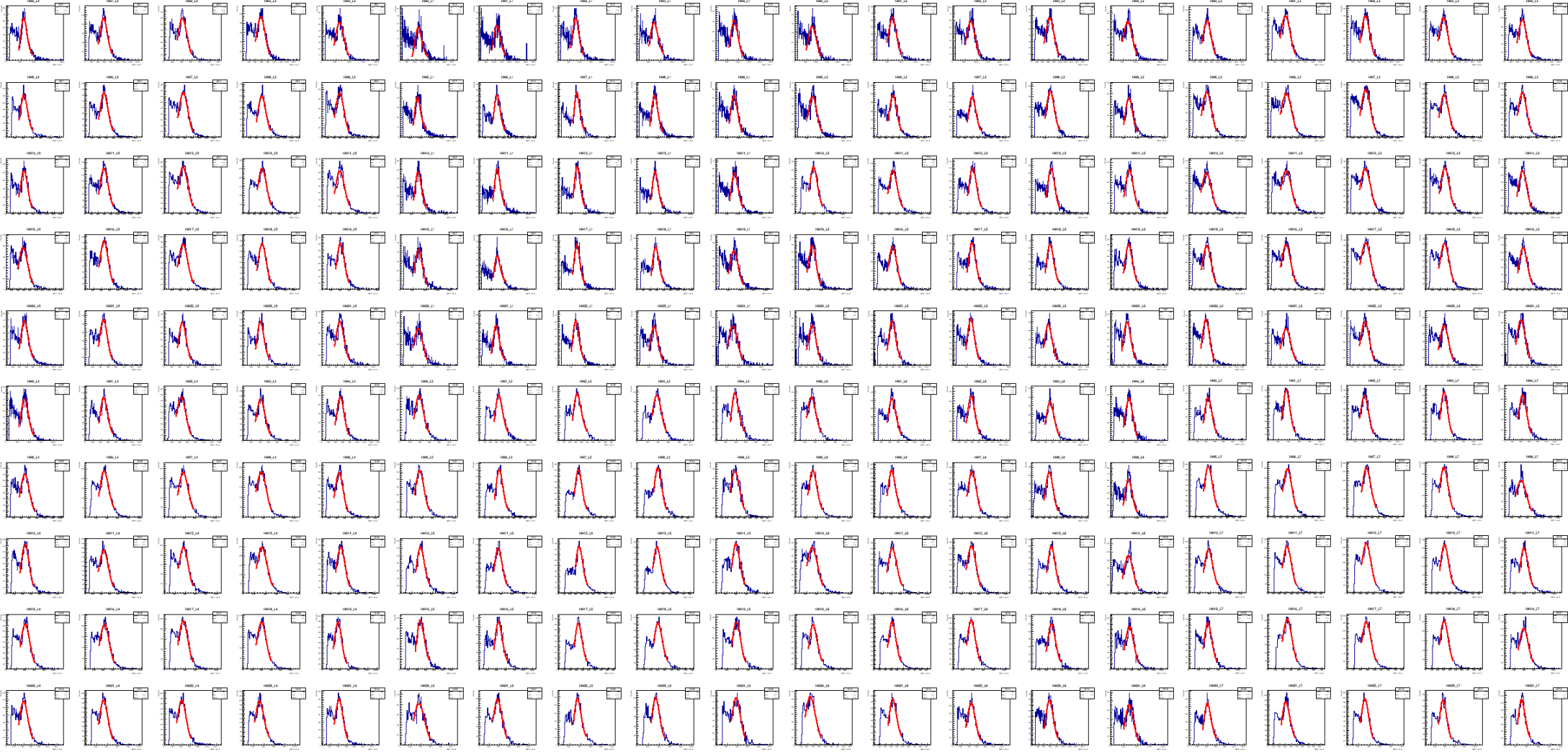
MIPs 汇总



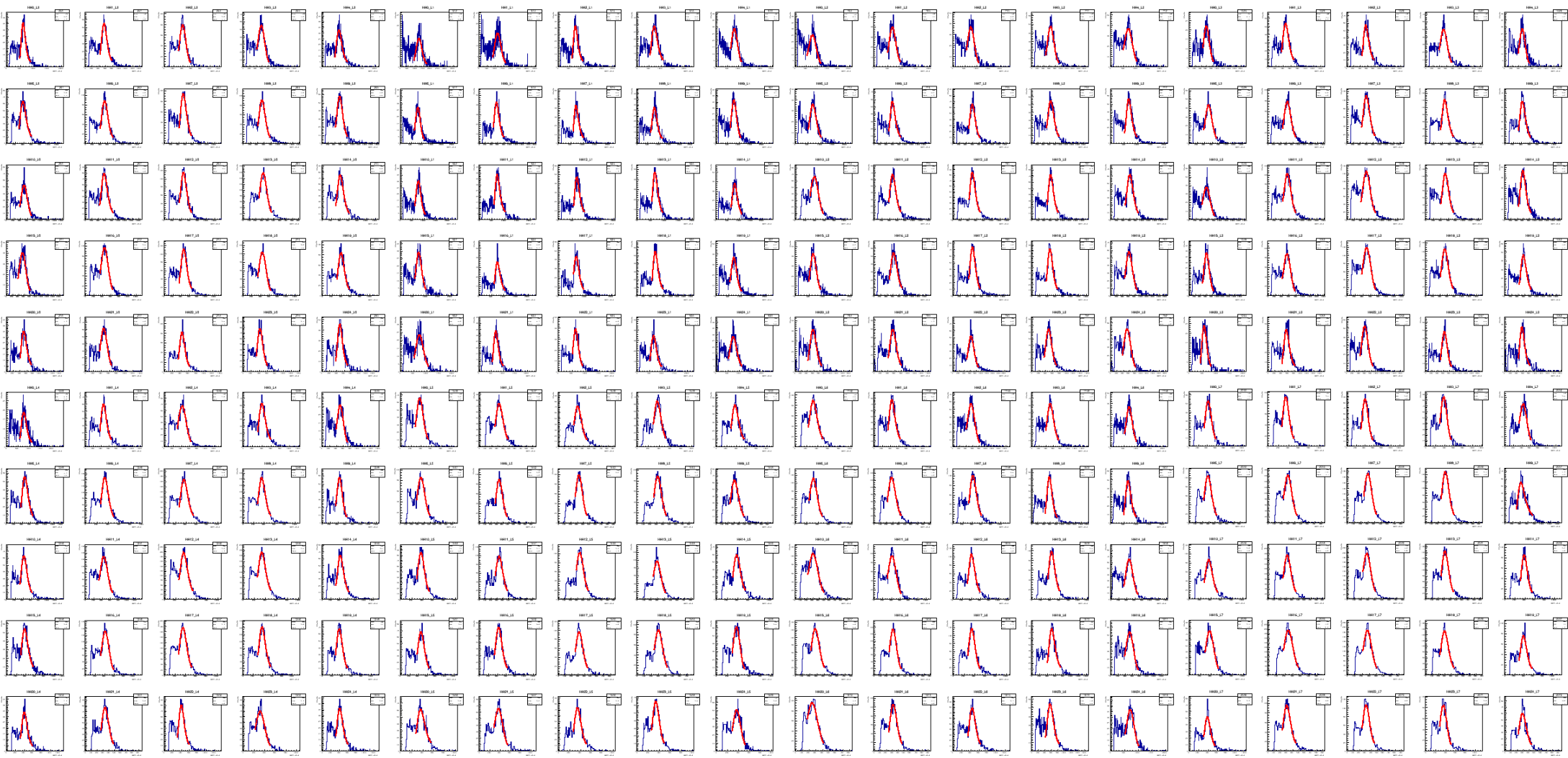
不同 BGO 晶体之间的 mpv 值 相差较大;



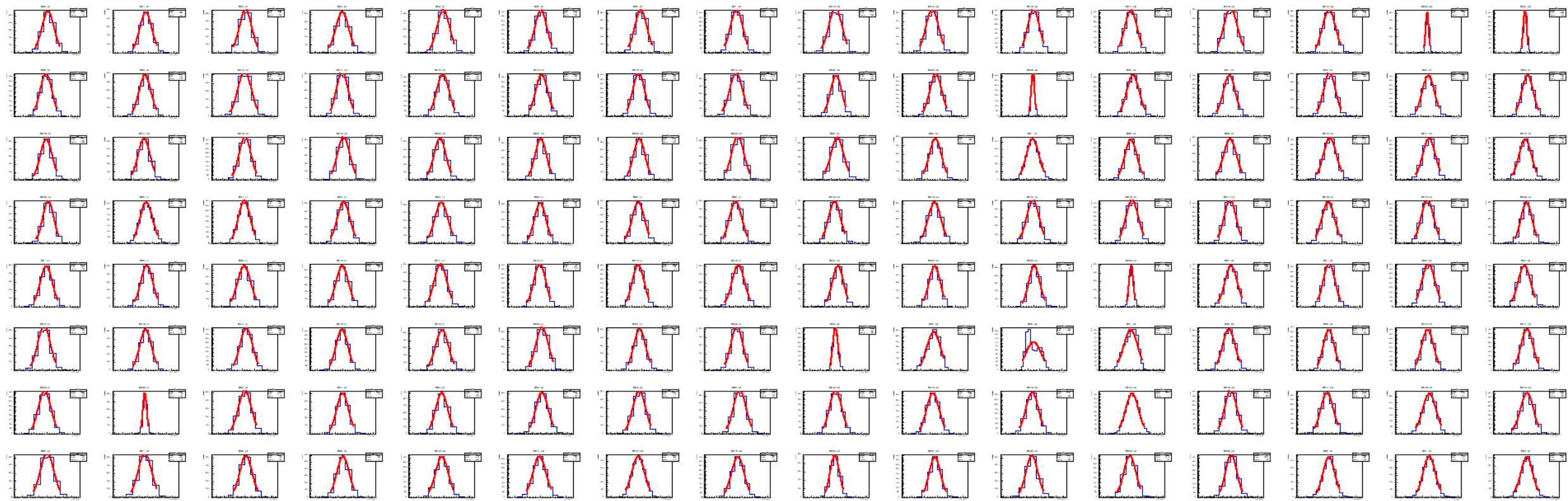
MIPs 高增益通道拟合结果



MIPs 高增益通道拟合结果



台基 HH 通道拟合结果



台基 HH 通道拟合结果

