TPC WG updates:

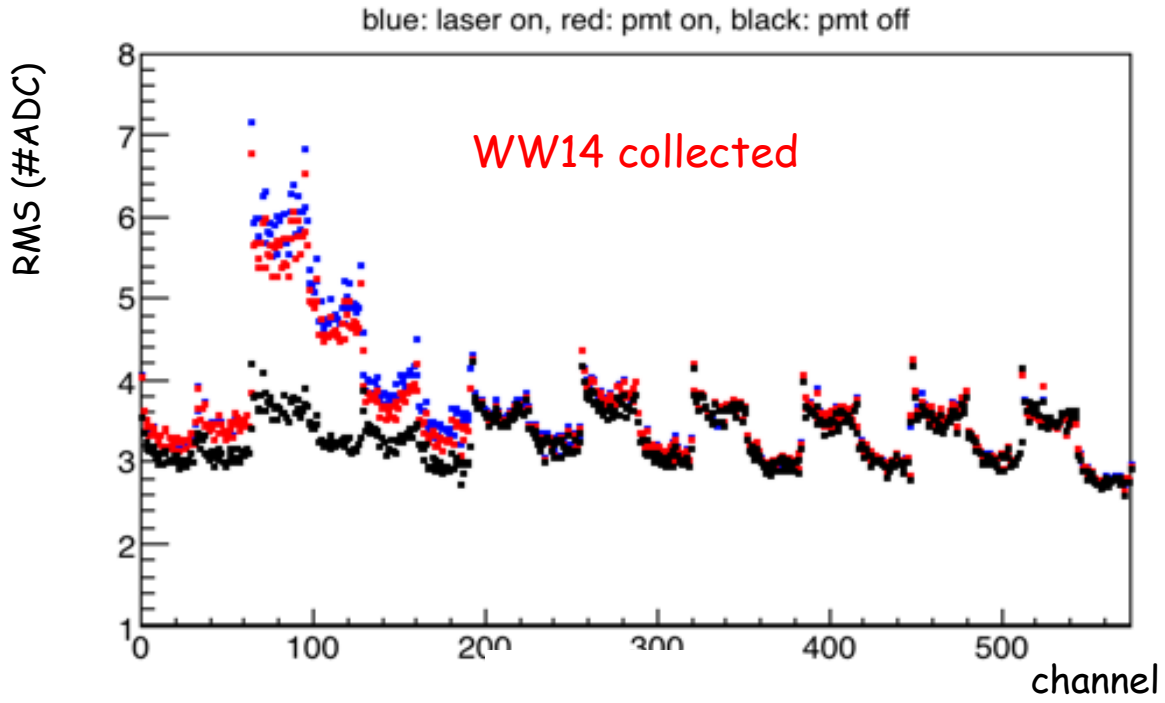
Report on investigation of noise induced by PMTs on the wires

WA104/ICARUS Technical Working Group Meeting

11/20/2019

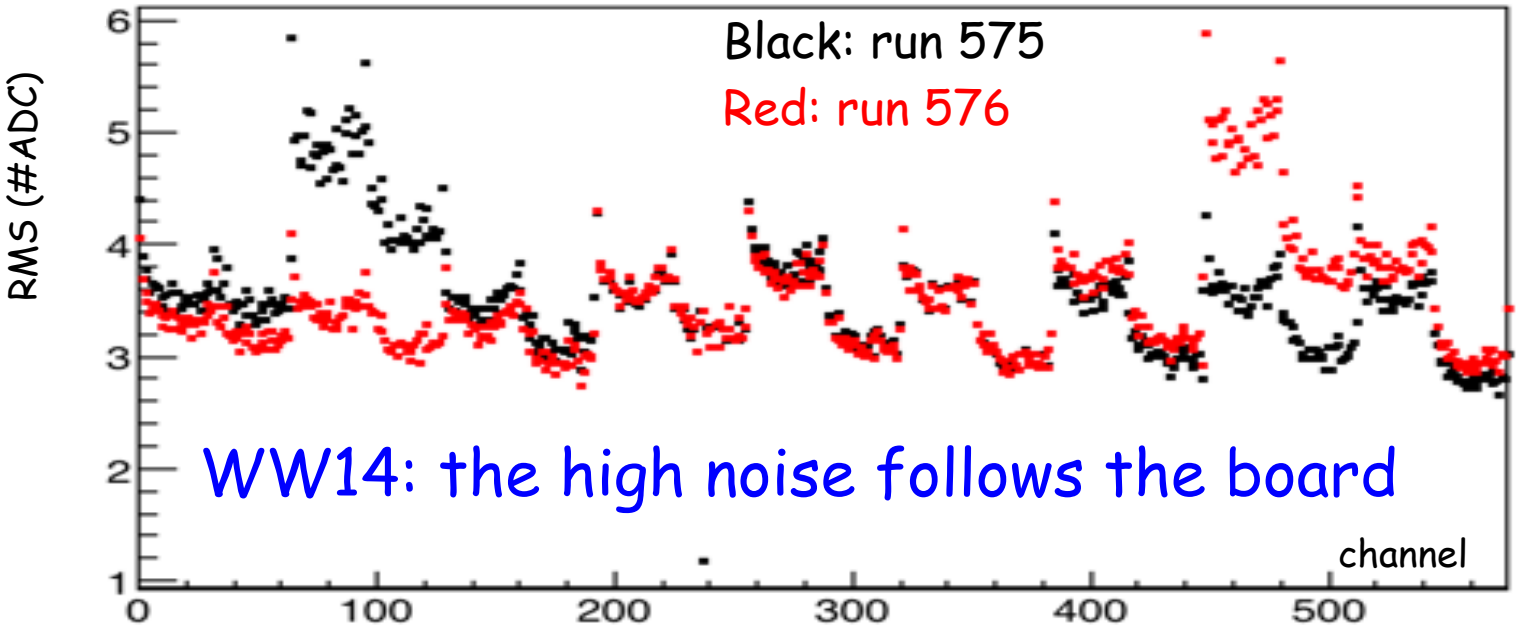
Noise measurements switching on the PMTs: previous tests

- Noise measurements performed to verify the possible effect introduced by PMTs activation.
- During the previous tests in October, two groups of 5 PMTs connected to WW14 (high voltage)/WW15(signal) have been switched on and the noise measurements have been performed in 3 different conditions: PMTs off (black points), PMTs on (red points), PMTs on and laser on (blue points)
- Change of the noise condition on 1 board in WW14



New tests on Nov. 9th: focus on WW14

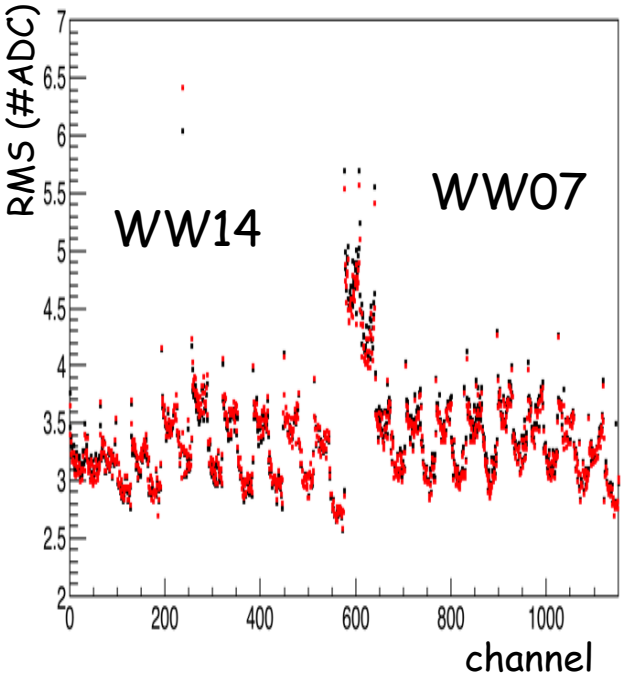
- New tests have been performed to verify the impact of the PMTs power on, changing for example the power supply system (connecting directly the Bertan to the PMT or going through the cow):
  - The effect was visible always on the board on slot 1 in WW14
- The exchange of the board on slot 1 with the board on slot 7 demonstrates that the problem is on the board and not related to the PMTs activation:
  - The board has been replaced and the problem disappears!



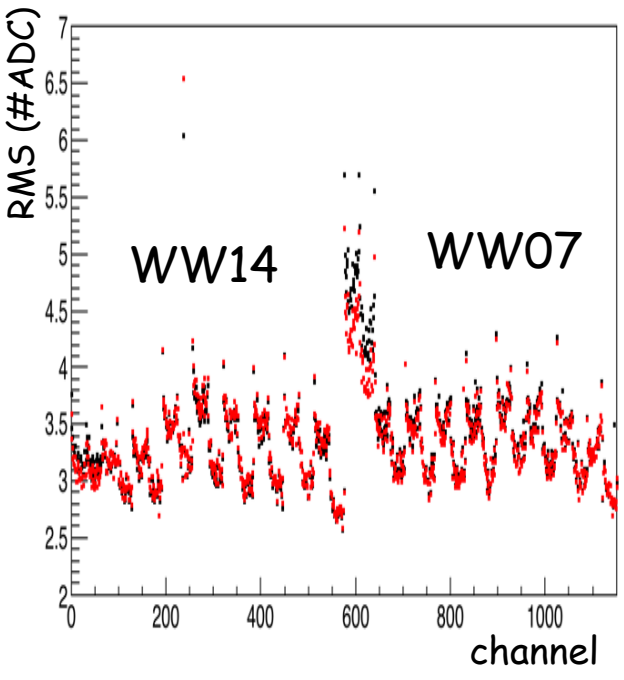
Possible effects of PMTs HV on the TPC wire noise

- Additional tests have been performed to verify the effect of the high voltage cabling in terms of noise on the TPC wires:
  - The 10 PMTs whose HV cables are connected in WW12, WW14 and WW16 have been separately switched on and the noise on WW14 has been monitored: globally 30 PMTs (1/3 of the detector) have been switched on and the effect has been monitored;
  - NO EFFECTS VISIBLE!!!

Black: PMT off,
Red: PMT on WW14 on



Black: PMT off,
Red: PMT on WW12 on



Black: PMT off,
Red: PMT on WW16 on