



## Poster session 1 - Monday 4 July

### P1.013 A highly-integrated receiver chip with an automatic baseline regulation for JUNO

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*on behalf of Jiangmen Underground Neutrino Observatory (JUNO) collaboration*

The Jiangmen Underground Neutrino Observatory (JUNO) is a multi-purpose underground experiment based on a 20,000 t liquid scintillator. The primary objective is the determination of the neutrino mass hierarchy by observing reactor antineutrinos.

The detection system has to accomplish both accurate energy measurements of the incoming neutrinos as well as precise direction measurement for muon background. For this reason, the readout system must provide good timing for the position reconstruction and a continuous charge measurement of the signals delivered by around 17,000 large photomultipliers (PMT) with a high quantum efficiency.

The signal acquisition receiver chain is integrated into the PMT housing to reduce the number of cables in the detector and is optimized for a minimum of power dissipation. The accuracy is achieved by a highly-integrated receiver chip which includes the analog to digital converter and the analog frontend with no external components used. After digitization, the digital part of the receiver chip compresses the data and includes timing information, as well as processing the signal for a fast trigger generation. A major feature in the processing scheme of the highly-integrated receiver chip is the vast configurability to select alternative modes and fine-tune operation parameters.

The signal is measured to detect photoelectrons (p.e.) from the PMT. The load of a p.e. is calculated from the signal with respect to the average baseline of the signal. This baseline can shift due to intersymbol interferences from other events, biasing changes of the PMT, and biasing fluctuations of the frontend circuitry. In order to minimize the influence of these baseline fluctuations, a compensation scheme is proposed that regulates the biasing of the analog circuitry so that the baseline is kept stable.