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New developments around the Butterfly antenna

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The Butterfly antenna is a compact, active and dual polarization antenna specifically developed for the radio detection of extensive air showers in the 20-200MHz frequency range. Butterfly antennas are in operations at Nançay for the CODALEMA experiment since october 2008, and at Auger for the AERA experiment since may 2013. The overall characteristics of an active antenna are given by the antenna itself, but also by its associated Low Noise Amplifier (LNA). A new LNA chip named LONAMOS has been designed to enhance the Butterfly characteristics. Strong constraints of linearity were imposed in this design in order to be compliant with the radio-astronomy needs.

Because of its characteristics, the Butterfly antenna has been chosen by many cosmic ray or radio astronomy experiments: 100 antennas for AERA located at the Pierre Auger Observatory (Argentina), 67 antennas for CODALEMA (France), 6 antennas for HELYCON (Greece). LNA boards using the LONAMOS chip have also been chosen by other experiments: 55 LNA boards for TREND (China), and 4000 LONAMOS chips for NenuFAR located at the Nançay observatory for a radio astronomy array of 1824 antennas.

In this contribution we will present the Butterfly antenna design keys, antenna modelization, characteristics enhancements with the new LONAMOS LNA, and measurements results.

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