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The X-HPD: Development of a large spherical hybrid photodetector

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The X-HPD concept is a modern implementation of the Dumand and Lake Baikal approach to large area photon detectors, primarily aimed for water based Cherenkov detectors. The main components are an almost spherical vacuum tube of 8-inch diameter and a LYSO scintillation crystal mounted in the centre of the tube. The scintillation light produced after the impact of a photoelectron which was accelerated to about 20 keV energy is read out by a small standard PMT. In addition to the attractive characteristics already established with its historic predecessors, namely high gain, large collection efficiency and immunity to the earth magnetic field, the X-HPD concept leads to very high effective Q.E. values, an extended viewing angle and marginal transit time spread. We present recent results obtained with 2 prototype tubes built at CERN in collaboration with the company Photonis.

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