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Aerogel Cherenkov counters of the KEDR detector

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Particle identification system of the KEDR detector based on aerogel threshold Cherenkov counters ASHIPH (Aerogel SHifter PHotomultiplier). In 2014 the fully installed ASHIPH system began its operation in the KEDR experiment at the VEPP-4 M e+e−collider. The system contains 1000 liters of aerogel with the refractive index n=1.05. 160 counters are arranged in two layers and cover 96% of total solid angle. Micro-Channel Plate (MCP) PMTs with multialkali photocathode are used as photodetectors. Cherenkov light collection is performed by means of wavelength shifters (WLS). ASHIPH system gives a possibility to separate pi- and K-mesons with momenta from 0.6 to 1.5 GeV/c.

The high voltage supply system based on active HV dividers from PNPI (St. Petersburg) and slow control system have been developed. The data acquisition system has been developed for the two layers of the ASHIPH system. The position of each counter relatively to the tracking system was determined on BhaBha events and cosmic muons with accuracy about 1 mm. The event reconstruction program for the ASHIPH system was developed. The geometric efficiency of the system ASHIPH was verified with BhaBha events. Efficiency of relativistic particles detection was measured with cosmic muons and is equal (1-(7+-1)*10^-3). π/K-separation of 4σ at the momentum1.2GeV/c was obtained.

The operation experience and parameters of the ASHIPH system confirm the possibility to use such counters as PID system at Super Charm-Tau Factory.

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