KOPIO
WBS Dictionary

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WBS **1.2.6**

Number	Description
1.2.6	**Catcher**
1.2.6.1	**Aerogel Counter**
	A photon counter to veto gamma-rays coming along the neutral K beam. It consists of 370 identical modules placed in an array.
1.2.6.1.1	**Modules**
	One module is composed of a lead plate, aerogel tiles, a light-reflecting mirror, a light-collecting funnel and a 5-inch PMT.
1.2.6.1.1.1	**Aerogel Tile**
	Aerogel of the refractive index 1.03-1.05 to produce Cerenkov light upon the passage of electrons.
1.2.6.1.1.1.3	**Fabrication/Procurement**
	Procurement of 1665 liters of aerogel.
1.2.6.1.1.2	**Lead Plate**
	Lead plate to convert gamma-rays to electrons and positrons.
1.2.6.1.1.2.3	**Fabrication/Procurement**
	Procurement of 370 2-mm-thick lead plates.
1.2.6.1.1.3	**PMT - 5 inch**
	PMT to detect Cerenkov lights produced by aerogel tiles.
1.2.6.1.1.3.3	**Fabrication/Procurement**
	Procurement of 370 5-inch PMTs.

Number	Description
1.2.6.1.1.4	**Mirrors**
	Mirror to reflect Cerenkov lights into PMTs.
1.2.6.1.1.4.3	**Fabrication/Procurement**
	Fabrication of 370 mirrors with one side coated with aluminum by vacuum deposition.
1.2.6.1.1.5	**Funnels**
	Funnel placed in front of the PMT to collect lights otherwise going outside the PMT cathode.
1.2.6.1.1.5.3	**Fabrication/Procurement**
	Fabrication of 370 funnels with inner side coated with aluminum by vacuum deposition.
1.2.6.1.2	**Support Frames**
	Support frame to place aerogel counter modules.
1.2.6.1.2.3	**Fabrication/Procurement**
	Fabrication of a set of support frames for 370 aerogel counter modules.
1.2.6.2	**Guard Counter**
	A photon counter to veto gamma-rays coming to the periphery of the main neutral beam. It surrounds the aerogel counter and consists of 144 identical modules.
1.2.6.2.1	**Modules**
	One module is composed of 8 layers of lead plates, 8 layers of acrylic slabs and a 5-inch PMT.
1.2.6.2.1.1	**Acrylic Sheet**
	Transparent acrylic slab to produce Cerenkov light upon the passage of electrons.
1.2.6.2.1.1.3	**Fabrication/Procurement**
	Procurement of 1152 acrylic slabs.
1.2.6.2.1.2	**Lead Plate**

Number	Description
	Lead plate to convert gamma-rays to electrons and positrons.
1.2.6.2.1.2.3	**Fabrication/Procurement**
	Procurement of 1152 2-mm-thick lead plates.
1.2.6.2.1.3	**PMT - 5 inch**
	PMT to detect Cerenkov lights produced by aerogel tiles.
1.2.6.2.1.3.3	**Fabrication/Procurement**
	Procurement of 144 5-inch PMTs.
1.2.6.2.2	**Support Frames**
	Support frame to place guard counter modules.
1.2.6.2.2.3	**Fabrication/Procurement**
	Fabrication of a set of support frames for 144 guard counter modules.
1.2.6.3	**Readout Electronics**
	System of reading and recording PMT signals.
1.2.6.3.1	**HV Power Supply**
	Power supply to provide all PMTs with HV power.
1.2.6.3.1.3	**Fabrication/Procurement**
	Procurement of 514 (370+144) channels of the HV power supply.
1.2.6.3.2	**Waveform Digitizer**
	Waveform digitizer to digitize and record PMT signals.
1.2.6.3.2.3	**Fabrication/Procurement**
	Fabrication of 514 channels of the waveform digitizer.

Number	Description
1.2.6.3.3	**ADC's**
	ADC to digitize and record PMT signal charges.
1.2.6.3.3.3	**Fabrication/Procurement**
	Fabrication of 514 channels of the ADC.
1.2.6.3.4	**TDC's**
	TDC to digitize and record PMT signal timings.
1.2.6.3.4.3	**Fabrication/Procurement**
	Fabrication of 514 channels of the TDC.
1.2.6.3.5	**Cables**
	HV power and signal cables for all PMTs.
1.2.6.3.5.3	**Fabrication/Procurement**
	Procurement of 514 channels of the HV and signal cables.
1.2.6.4	**Monitoring System**
	Monitoring system to calibrate and monitor both aerogel and guard counters consisting of LEDs and associated electronics.
1.2.6.4.3	**Fabrication/Procurement**
	Fabrication of the monitoring system, composed of 2 temperature boxes, 6 optical fiber bundles, and 6 reference photomultipliers.
1.2.6.5	**Commissioning**
	Commissioning of the catcher, including the aerogel counter, guard counter and the monitoring system. It is carried out in steps including turn-on power tests, tests with the LED lights provided by the monitoring system, tests with the actual beam and calibration runs.