

SPECIFICATION OF THE ACTIVE COLLIMATOR AND ELECTRONICS

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0. Introduction

The following specifications must be met by the active collimator before the device and its readout electronics are shipped to Jefferson Lab.

1. Amplifier Gain and Bandwidth

- Each of the amplifiers will be tested together with the sampling adc, while connected to the active collimator on the bench. A current pulse will be injected into the tungsten wedge through direct contact of the injector lead on one of the exposed mounting screws holding it to the insulating support. The amplifier will be connected to the wedge readout contact through a 30cm 75Ω coaxial cable. The response will be measured in each of the following gain modes.
 - $10^{12} \Omega$: dc gain $> 2 \times 10^{11} \Omega @ 1\text{Hz}$, bandwidth $1 \pm 1 \text{ Hz}$.
 - $10^{11} \Omega$: dc gain $(1.0 \pm 0.1) \times 10^{11} \Omega @ 1\text{Hz}$, gain-bandwidth product $1.0 \pm 0.1 \text{ THz}$.
 - $10^{10} \Omega$: dc gain $(1.00 \pm 0.05) \times 10^{10} \Omega @ 1\text{Hz}$, gain-bandwidth product $1.0 \pm 0.1 \text{ THz}$.
 - $10^9 \Omega$: dc gain $(1.00 \pm 0.05) \times 10^9 \Omega @ 1\text{Hz}$, gain-bandwidth product $1.0 \pm 0.1 \text{ THz}$.
 - dynamic range in 3 above gain ranges: factor 1000: (10mV : 10V)

2. DC Isolation of the Tungsten Wedges

- With the amplifiers disconnected, a voltage of 10kV will be applied to the aluminum housing. Then one-by-one the tungsten wedges will be held at ground and the current on the wedge measured. The following tolerance is stated for the current on the grounded tungsten wedge while the housing is at 10kV.
 - current at 10kV bias voltage: $< 1 \text{ nA}$ measured between the wedge and the ground side of the 10kV supply, connected through a $10\text{M}\Omega$ resistor.

