

# DUNE ColdADC ASIC Preliminary Testing Results

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## **Abstract**

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## 1 Introduction [Grace/Lin]

## 2 Test Setup

### 2.1 Cryogenic Test System (CTS) [Lin]

### 2.2 BNL Test System [Gao]

Describe BNL test setup including the test boards.

### 2.3 Fermilab Cryo Cooler Test System [Christian]

Describe Fermilab test setup including the test boards.

### 2.4 LBNL Test Board [Lin]

## 3 Functional Testing [Christian]

Discuss functional testing including reading/writing registers with I2C and UART, verifying the data I/O, including LVDS current control, and verifying clock generation.

## 4 Performance Results

### 4.1 Noise

#### 4.1.1 ColdADC Only

#### 4.1.2 LArASIC + ColdADC [**Gao**]

### 4.2 Static Linearity (INL,DNL)

### 4.3 Dynamic Linearity (ENOB)

### 4.4 Channel Crosstalk

## 5 Issues Identified and Mitigations

### 5.1 Autocal

### 5.2 IR Drop

### 5.3 Level Shifter

### 5.4 ADC Core Linearity

### 5.5 SHA/MUX Linearity

### 5.6 SDC Linearity

### 5.7 SHA/MUX Crosstalk

### 5.8 BGR Op-amp

### 5.9 Reset Out-of-Sync Between Two ADC Pipelines

### 5.10 Overflow Wraparound

## 6 Production Testing [**Furic**]

### 6.1 Test Setup

### 6.2 Results

## 7 Summary

# Appendix