

# DIAGNOSTIC DESIGN

## MAST Installation

PLEASE NOTE THAT COMMENTS REGARDING THE DESIGN, FROM JUNE 19TH MEETING, APPEAR IN THESE BOXES

# Overview

- Materials
  - 316 stainless steel
  - Boron Nitride Grade COMBAT A ceramic solid from St. Gobain
  - Phosphor Bronze PB102 (custom insert)
- Secure Screws
  - Spot-welding SS wire on SS316 screws
  - Spot-welding SS wire on BN?
- Diagnostic Design
  - 4-channel array
  - Each channel separated by 7.5 degrees

COMMENT 2

ISSUE: IS GRADE OF BN CERAMIC APPROPRIATE?

IDEA: CONTACT MAST COLLEAGUES

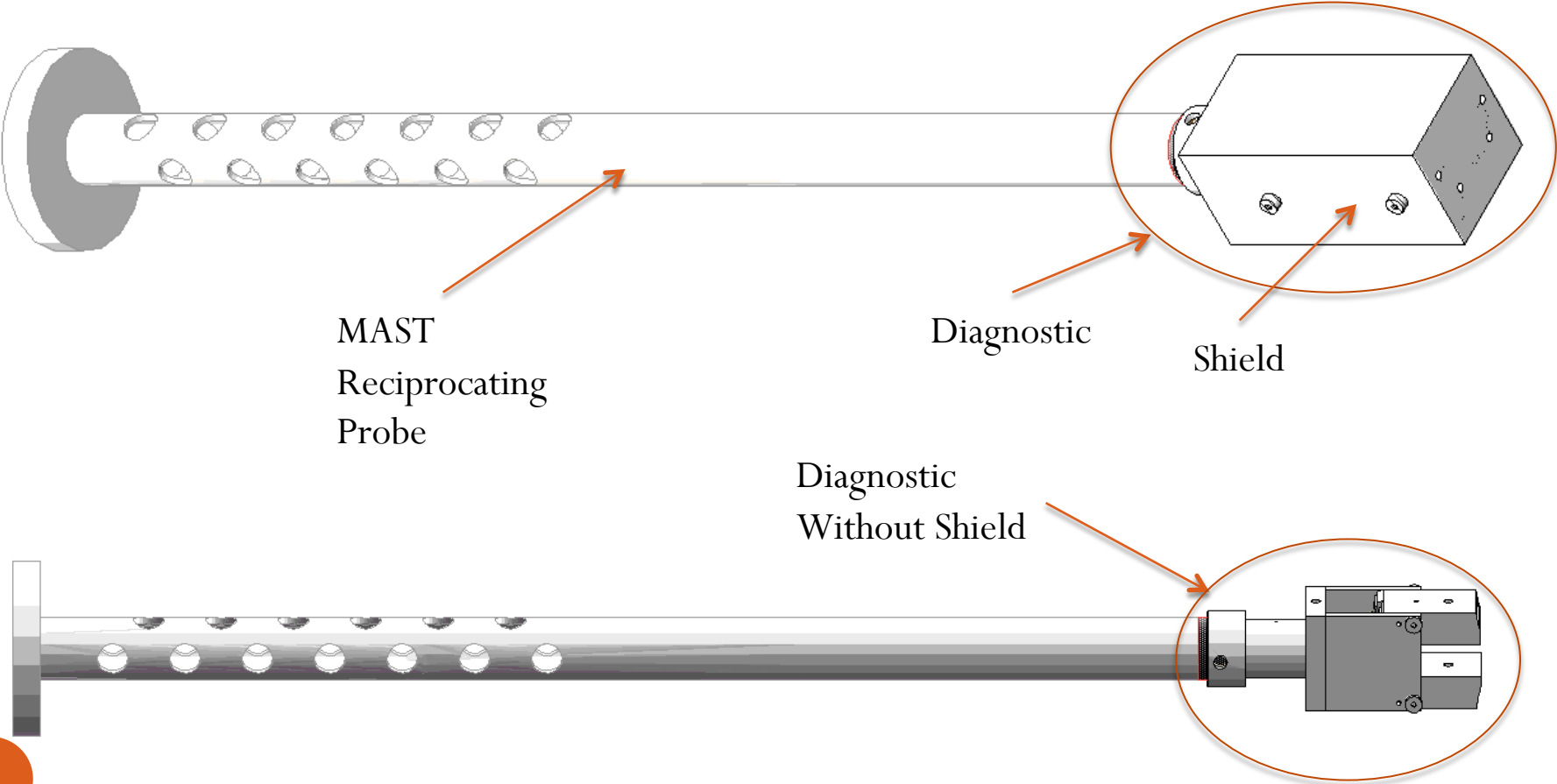
COMMENT 9

ISSUE: MAST DESIGN REGULATIONS REGARDING DIAGNOSTICS

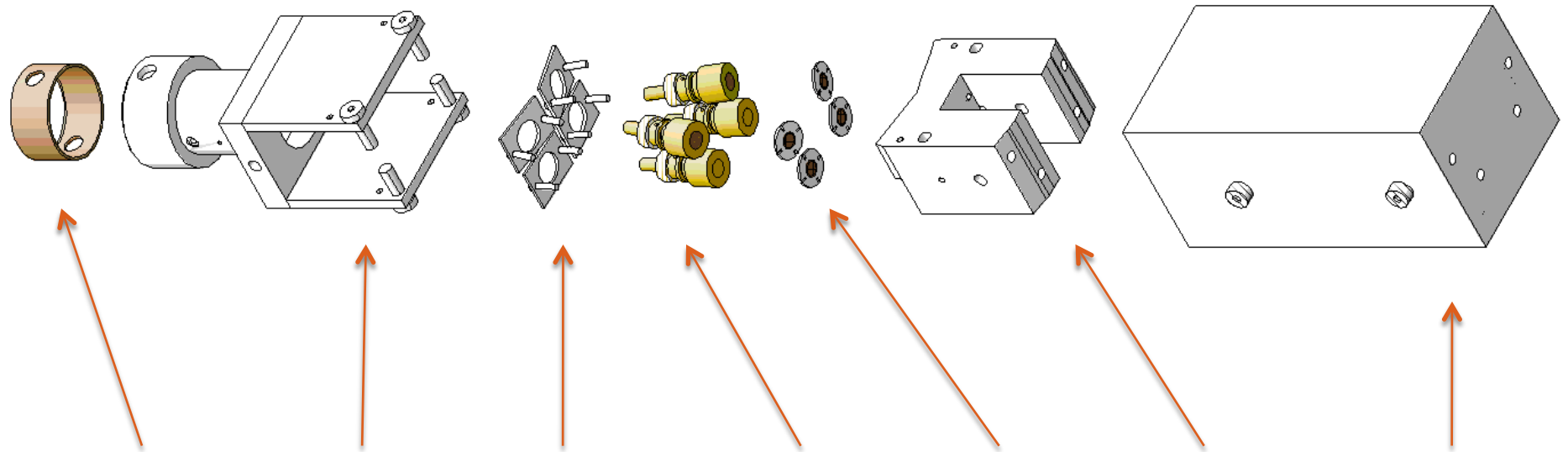
IDEA: CONTACT MAST COLLEAGUES

# Total Assembled View

NOTE THAT SLIDE 14 HAS COMMENTS ON SHIELD



# Total Exploded View



Bronze insert

Connector

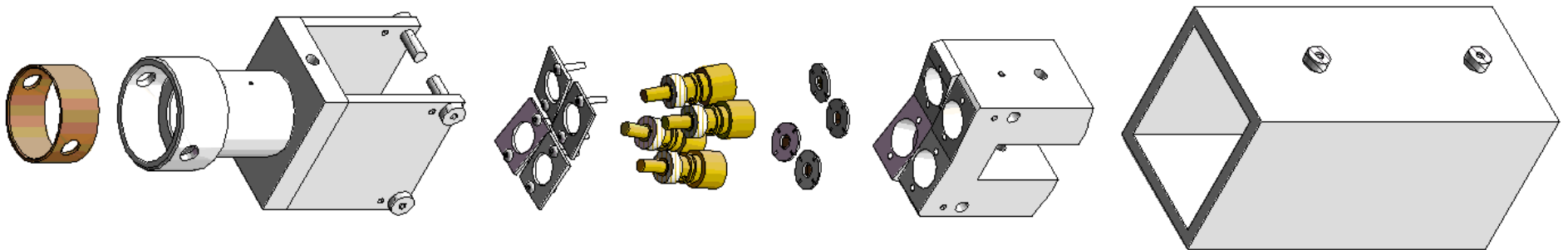
Base X 4

Detector X 4

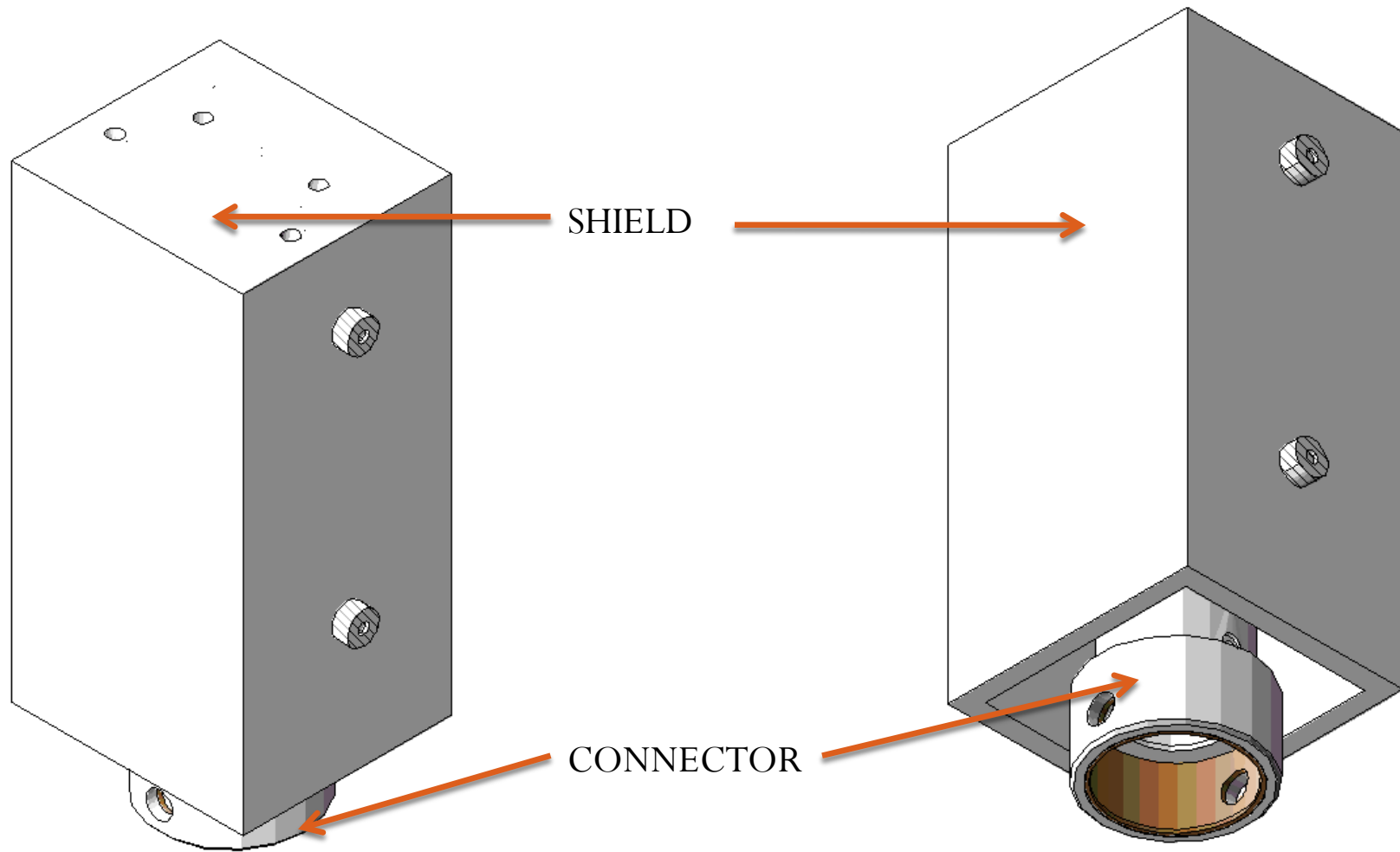
Foil X 4

Module

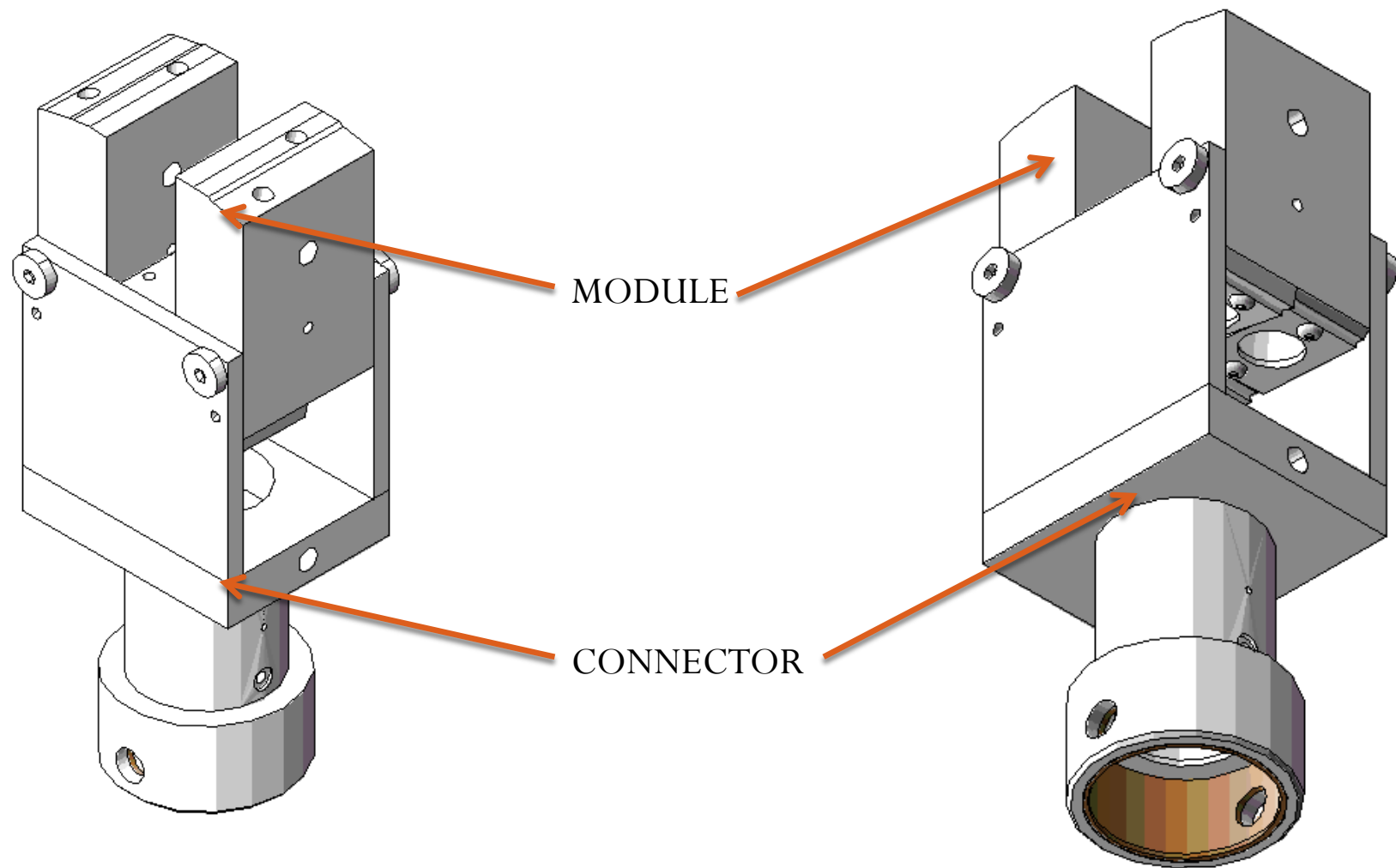
Shield



# Assembled View with Shield

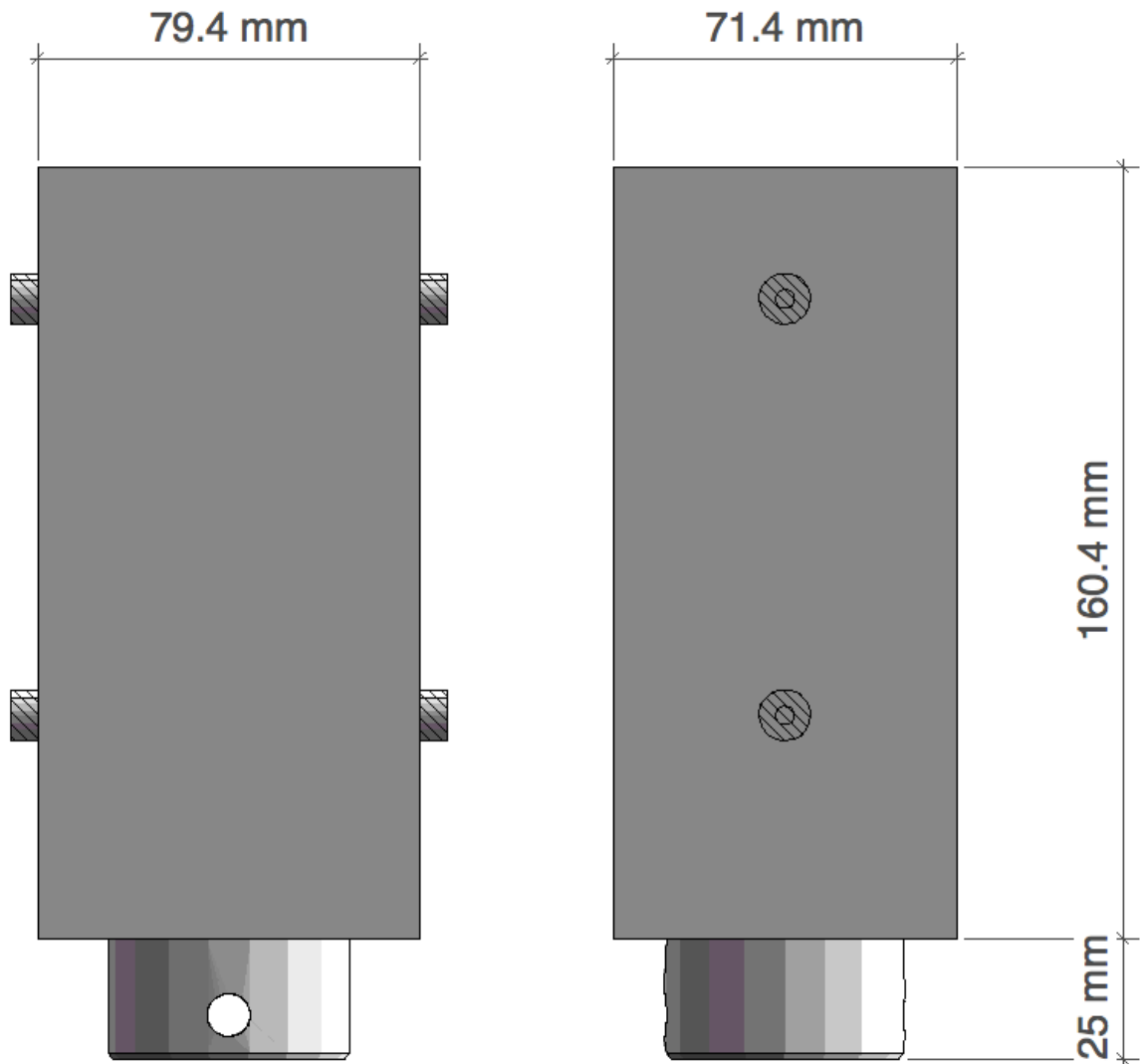


# Assembled View without Shield

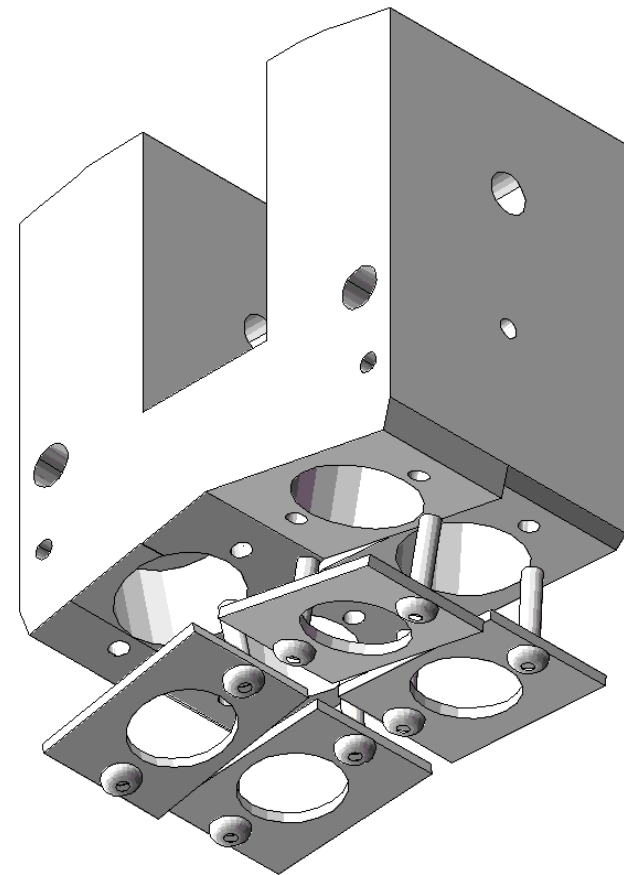
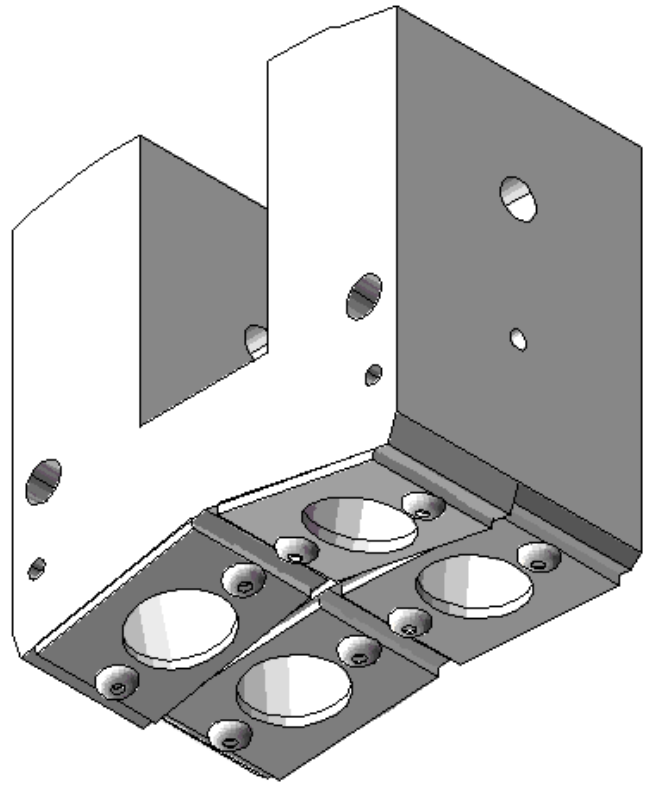
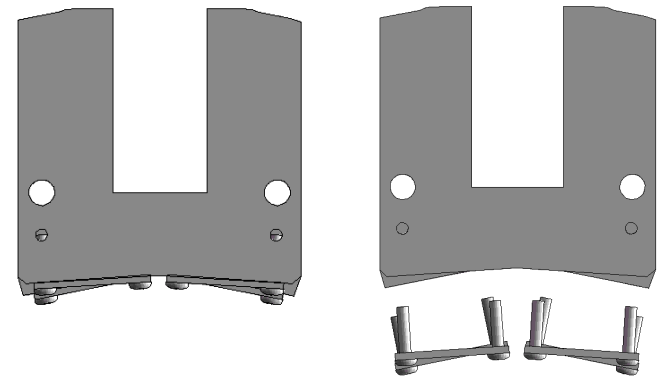


# Total Assembled Dimensions

COMMENT 1  
ISSUE: POSSIBLE  
HARDWARE  
COMPLICATIONS AT  
MAST, FOR EXAMPLE  
NEEDING TO REPLACE A  
MACHINE SCREW  
IDEA: CHANGE ALL  
MEASUREMENTS AND  
HARDWARE TO METRIC

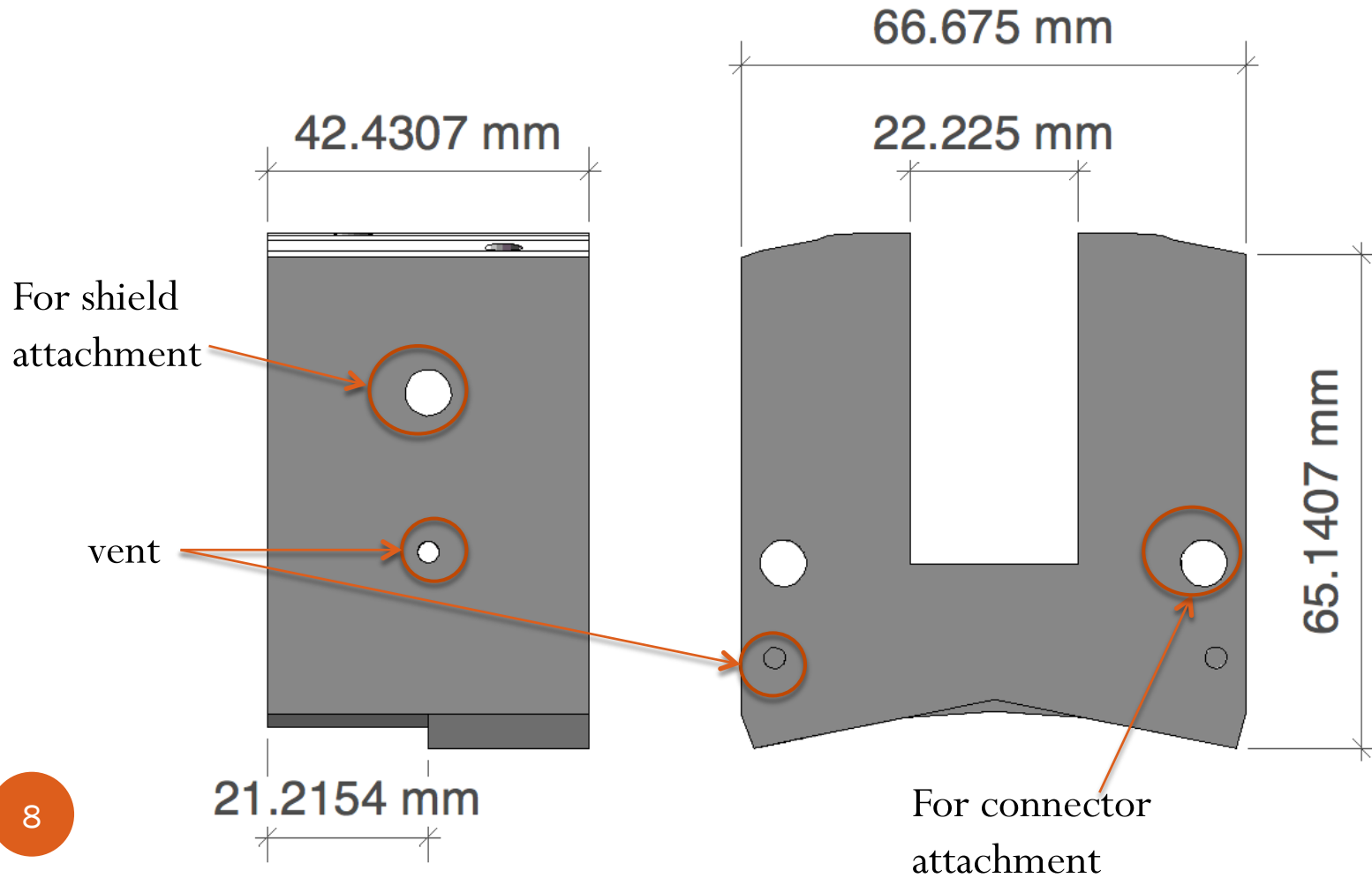
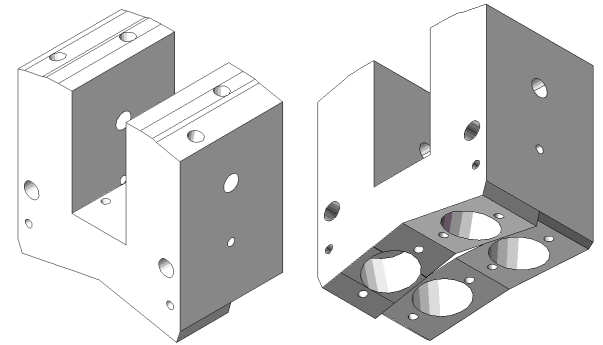


# Module Exploded View with Bases

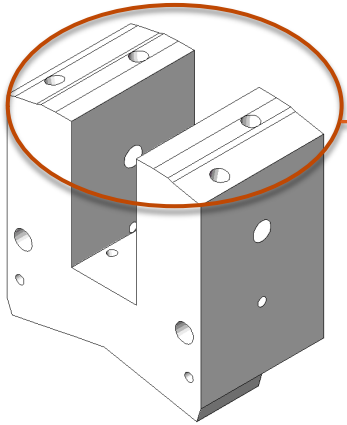




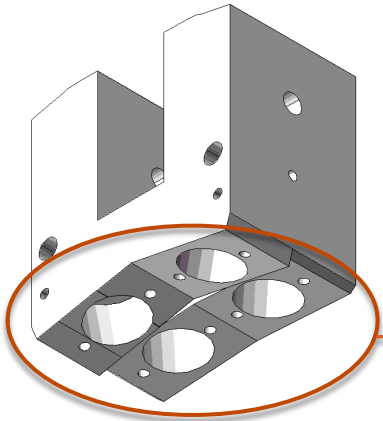
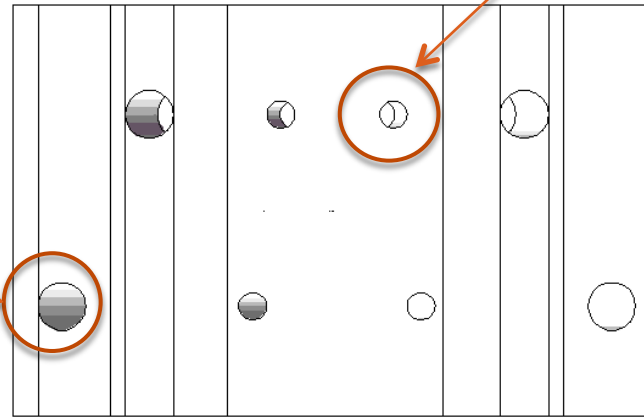
# Module Dimensions



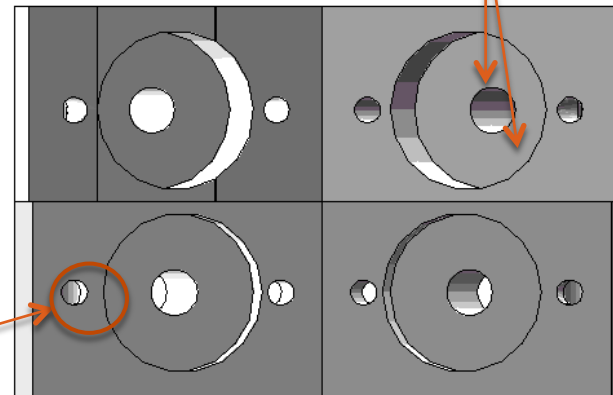
# Module



collimator  
hole

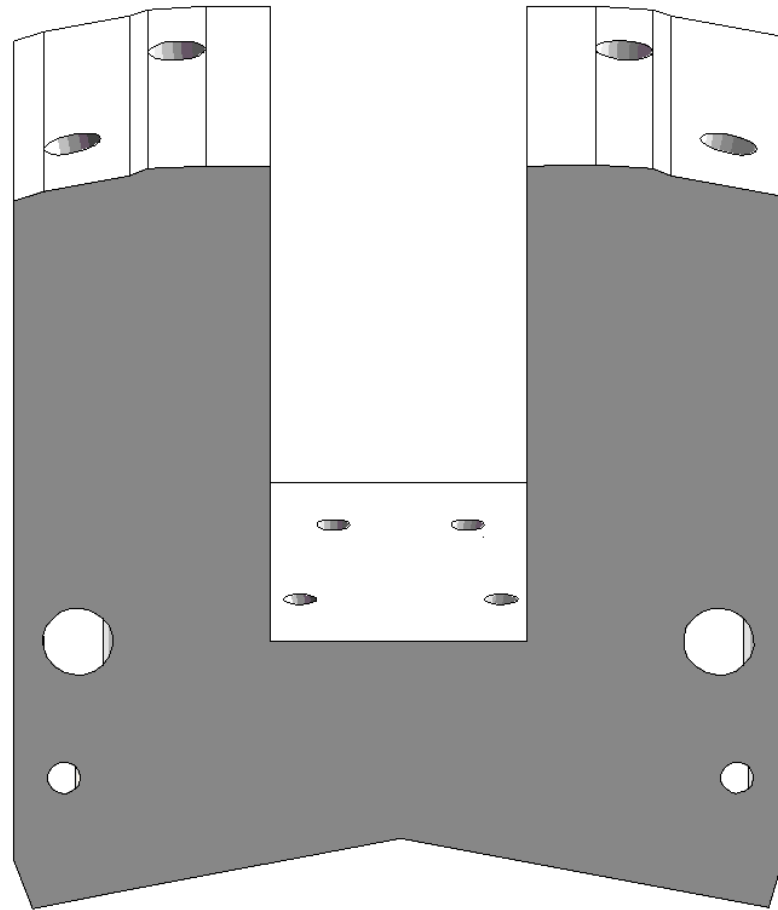
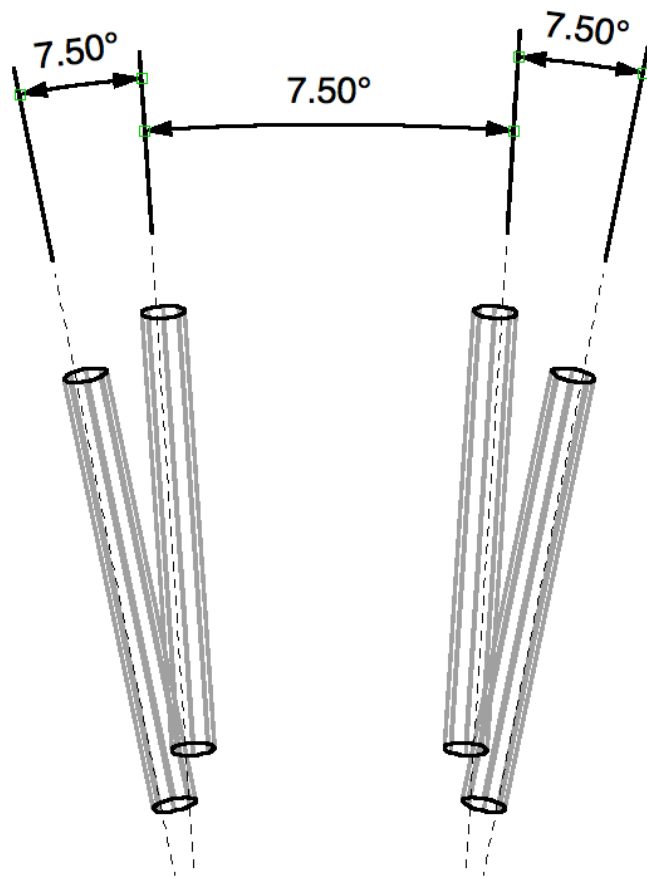


detector and  
collimator hole



secure base  
to hold  
detectors

# Module Angles

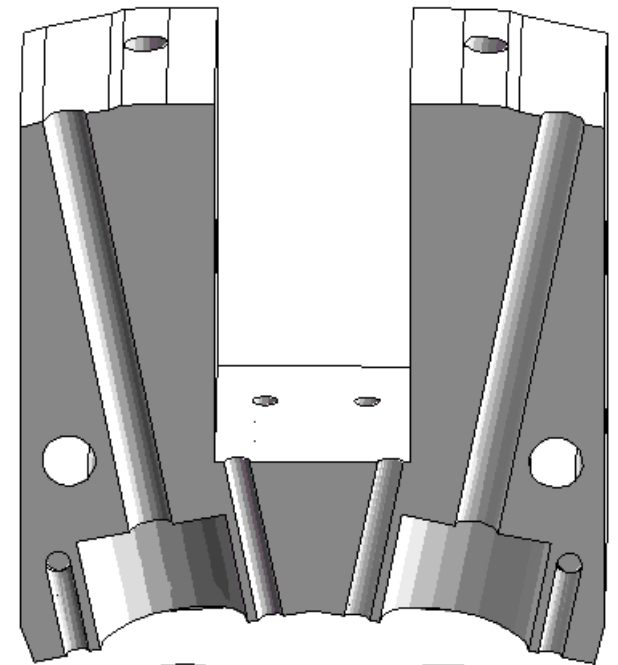
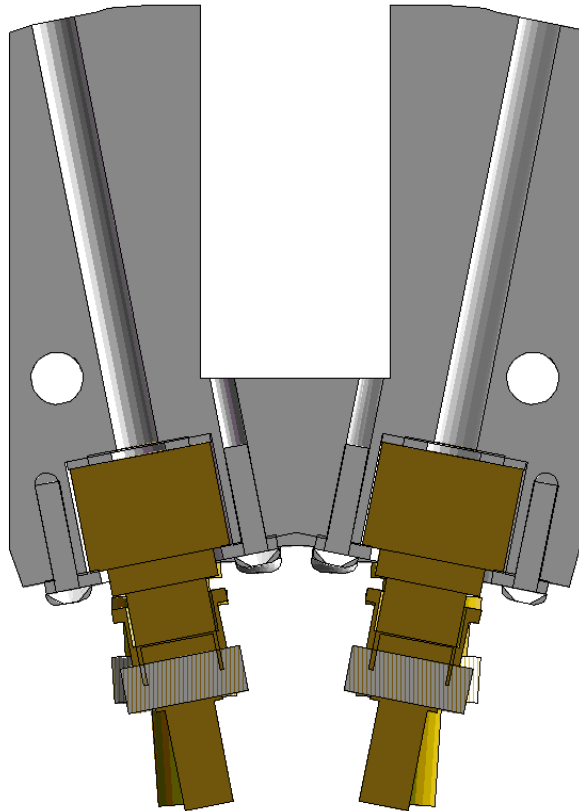


# Module Cross Section

COMMENT 8

ISSUE: DETECTOR INSULATION

IDEA: USE UHV (ULTRA HIGH VACUUM) APPROVED INSULATOR SUCH AS PEEK, VESPEL, MAYCOR, BN CERAMIC, OR TEFLON TO CREATE A THIN SLEEVE AROUND INDIVIDUAL DETECTORS; CONTACT MAST COLLEAGUES FOR MATERIAL APPROVAL



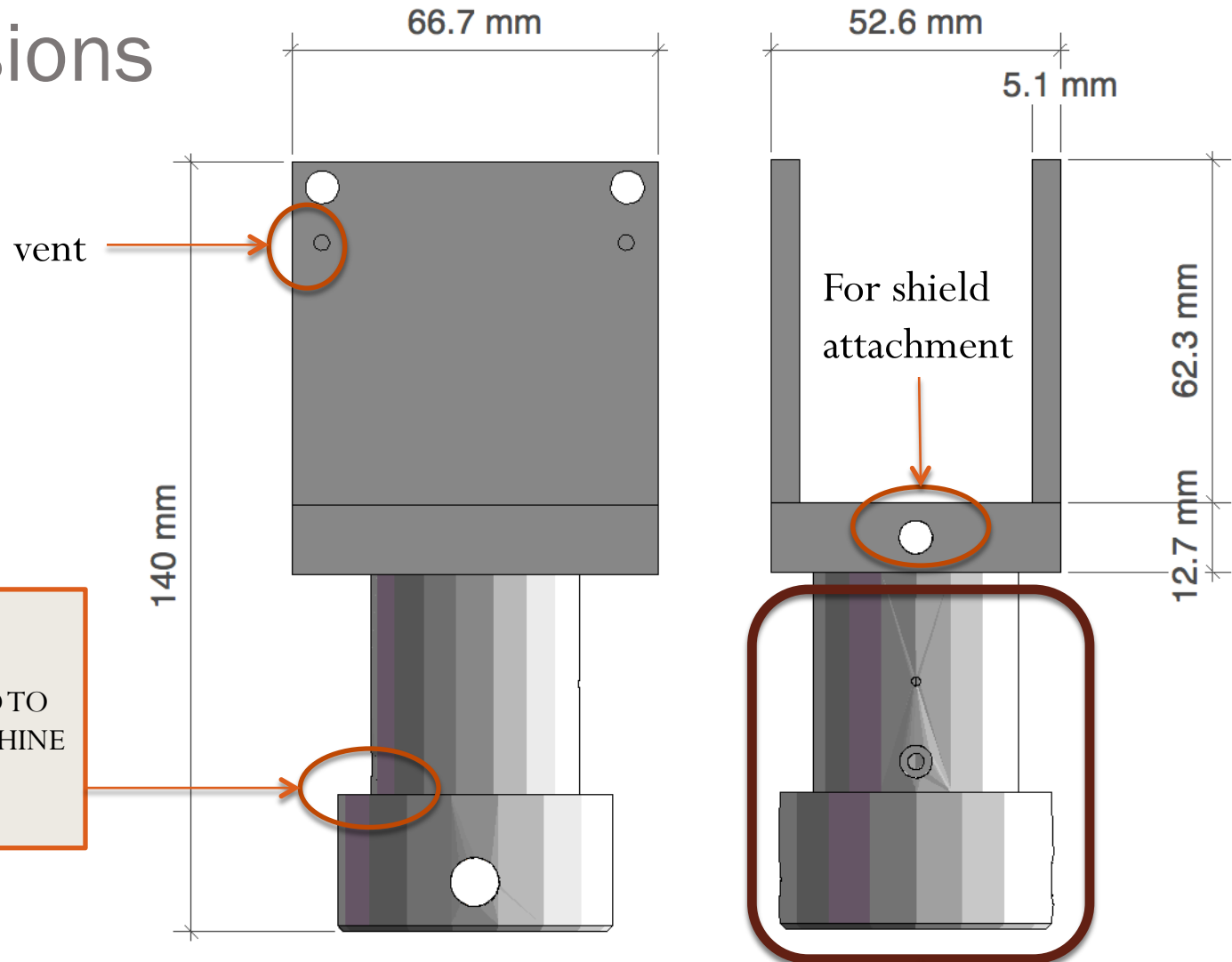
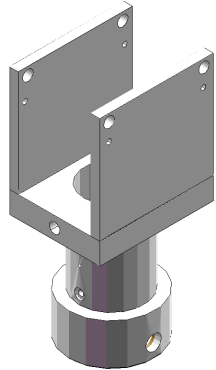
Foil

Detector

Base

BNC connector

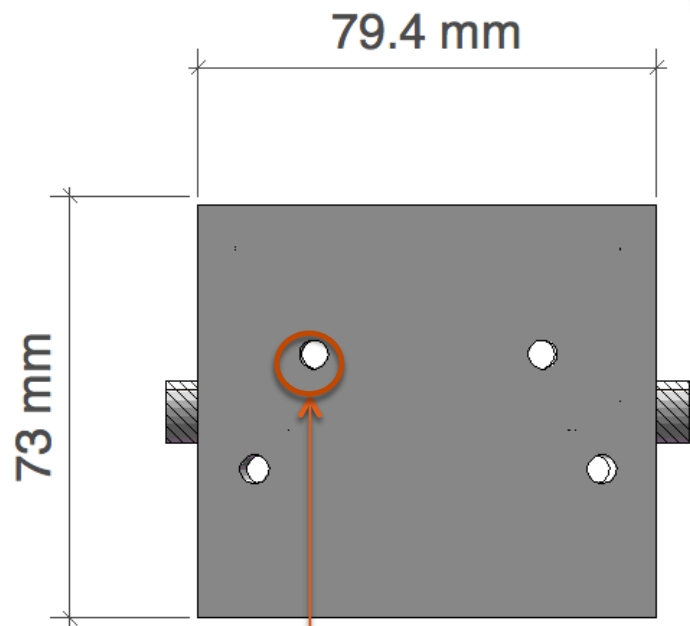
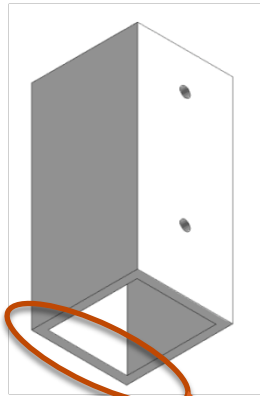
# Connector Dimensions



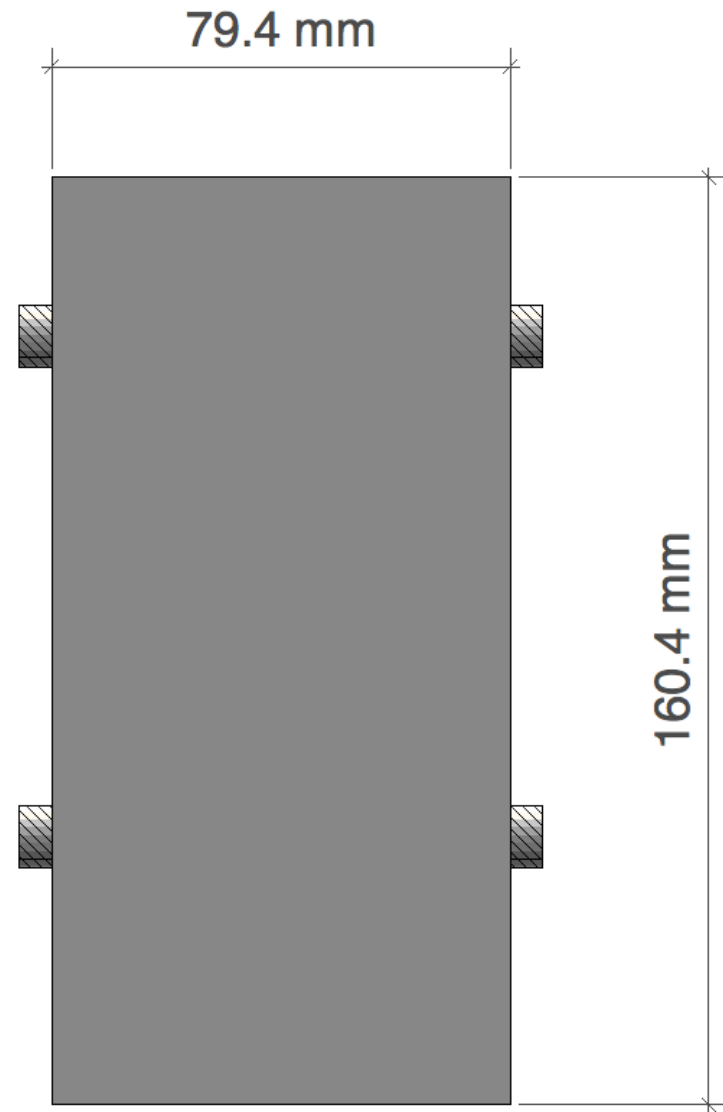
COMMENT 7  
STATEMENT: THIS SHARP  
EDGE WILL BE ROUNDED TO  
REFLECT THE MAST MACHINE  
DRAWINGS

This part is replicated from MAST machine drawings  
to provide for attachment to reciprocating probe

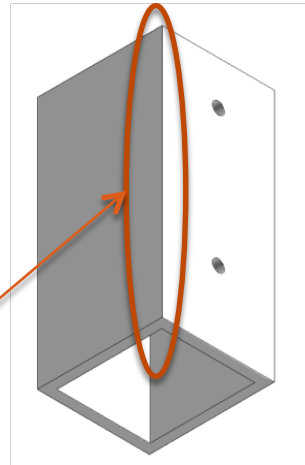
# Shield Dimensions



collimator diameter: 5mm  
wall thickness: 6.35 mm



# Shield



## COMMENT 5

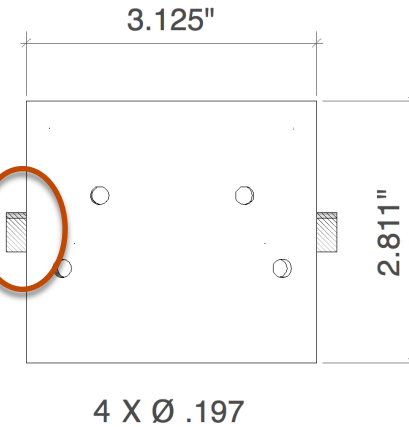
ISSUE: SHARP EDGES ON SHIELD

IDEA: ROUND ALL EDGES ON SHIELD  
(INCREASE SHIELD THICKNESS SO  
EDGES ARE STILL .25" IN THICKNESS)

## COMMENT 6

ISSUE: IS ROUNDED RECTANGULAR SHAPE OKAY  
FOR SHIELD, OR DOES MAST PREFER  
CYLINDRICAL?

IDEA: CONTACT MAST COLLEAGUES



## COMMENT 4

ISSUE: SCREWS NOT FLUSH WITH SURFACE

IDEA: RECESS SCREW HEAD SO IT IS FLUSH  
WITH THE SHIELD SURFACE

## COMMENT 3

ISSUE: SECURE SCREWS TO BN SHIELD

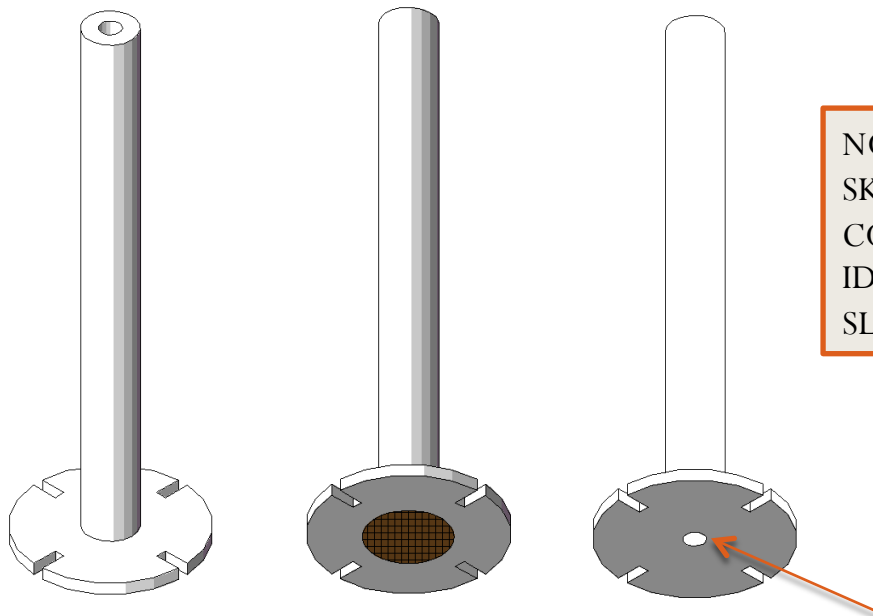
IDEA: SPOTWELD SHIMSTOCK STRAP FROM  
SCREW HEAD TO CONNECTOR OR USE  
APPROVED UHV CERAMIC ADHESIVE

# Alternate Washer to Change Collimator Size

COMMENT 10

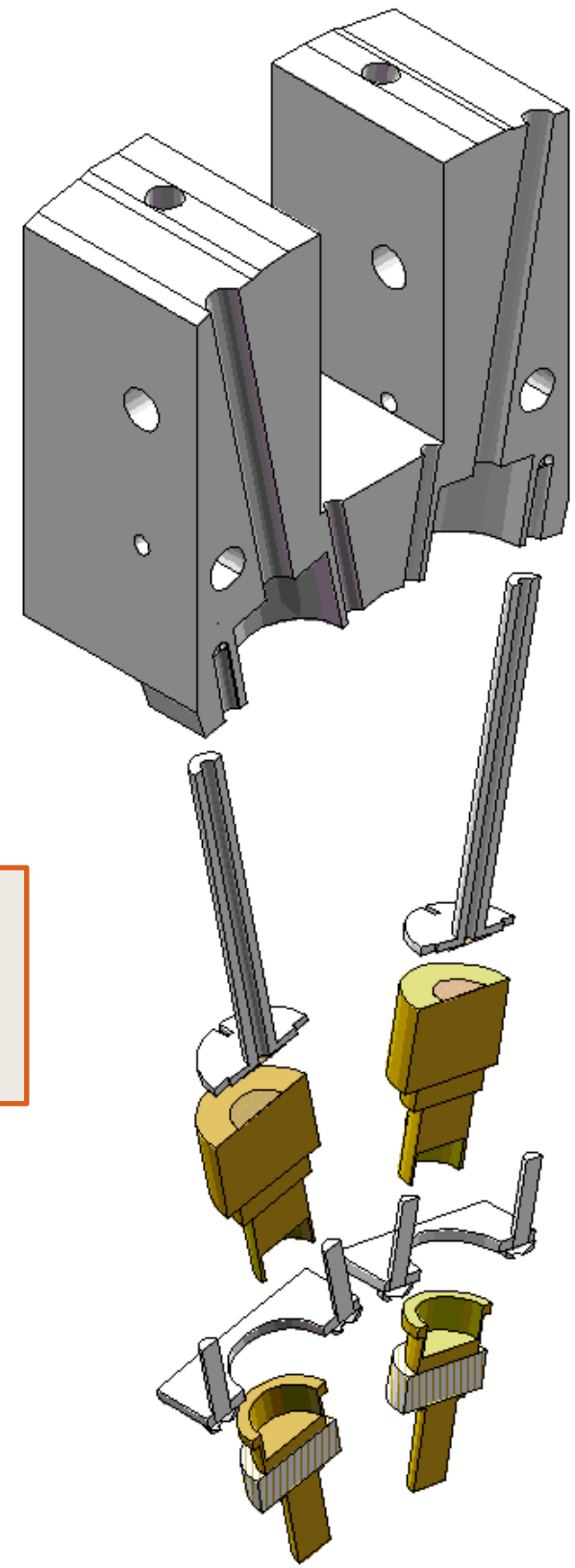
ISSUE: NEED ANOTHER WAY TO CHANGE COLLIMATOR SIZE, PREFERABLY ONLY REQUIRING THE REMOVAL OF THE BN SHIELD (UNLIKE METHOD SHOWN HERE)

IDEA: INSERT NEW COLLIMATOR CYLINDER THROUGH TOP OF MODULE AND PROVIDE FOR ATTACHMENT



NOTE THAT SKETCH FOR COMMENT 10 IDEA IS ON SLIDE 16

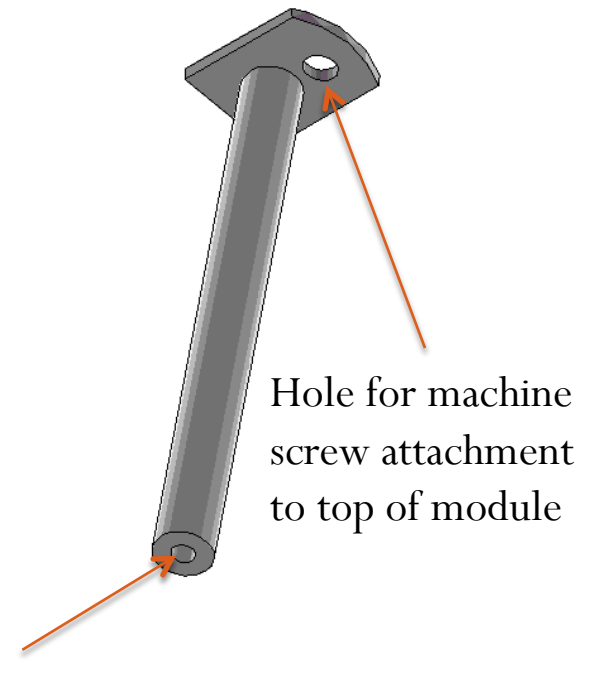
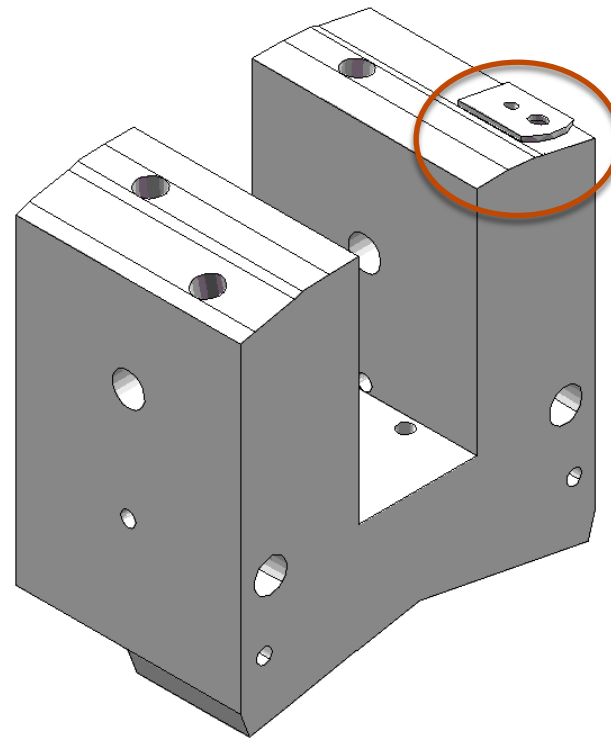
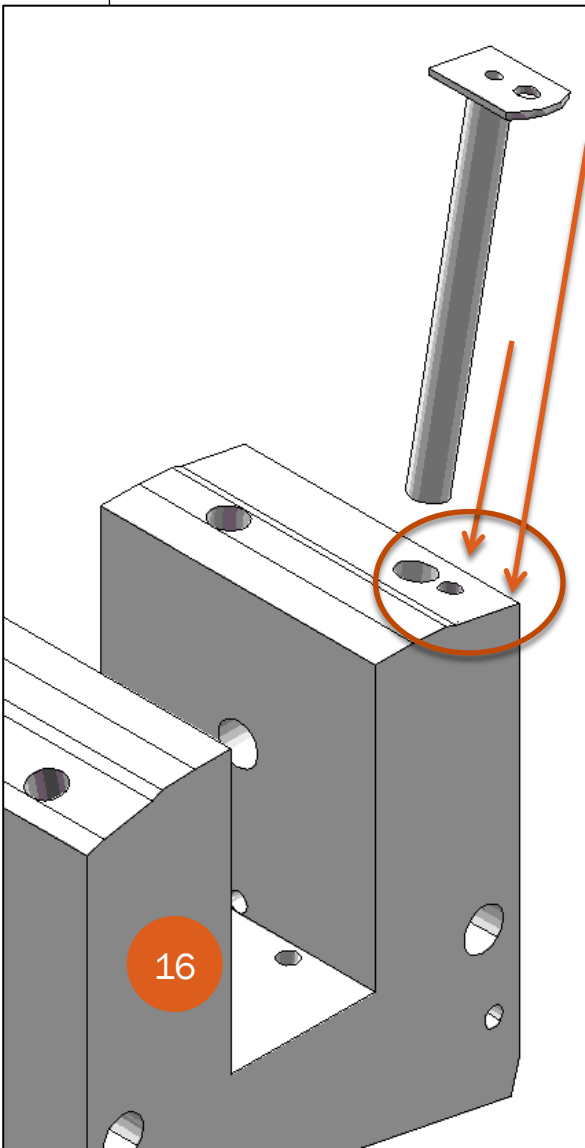
New collimator size





# Alternate Washer to Change Collimator Size

SKETCH OF IDEA FOR  
COMMENT 10



Hole for machine  
screw attachment  
to top of module

New collimator size