

DIAGNOSTIC DESIGN

MAST Installation

PLEASE NOTE THAT PPPL COMMENTS REGARDING
THE DESIGN APPEAR IN THESE BOXES

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Overview

- Materials

- 316 stainless steel
- Boron Nitride Grade COMBAT A ceramic solid from St. Gobain

- Phosphor Bronze PB102

- 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

RESPONSE ST. GOBAIN GRADE XP (HIGH PURITY-LOW MOISTURE ABSORPTION)

BRONZE WASHER NOW INCORPORATED INTO CURRENT MAST RP- NOT NEEDED FOR PLUG HOUSING UNIT (GET UPDATED RP DRAWINGS)

COMMENT 9

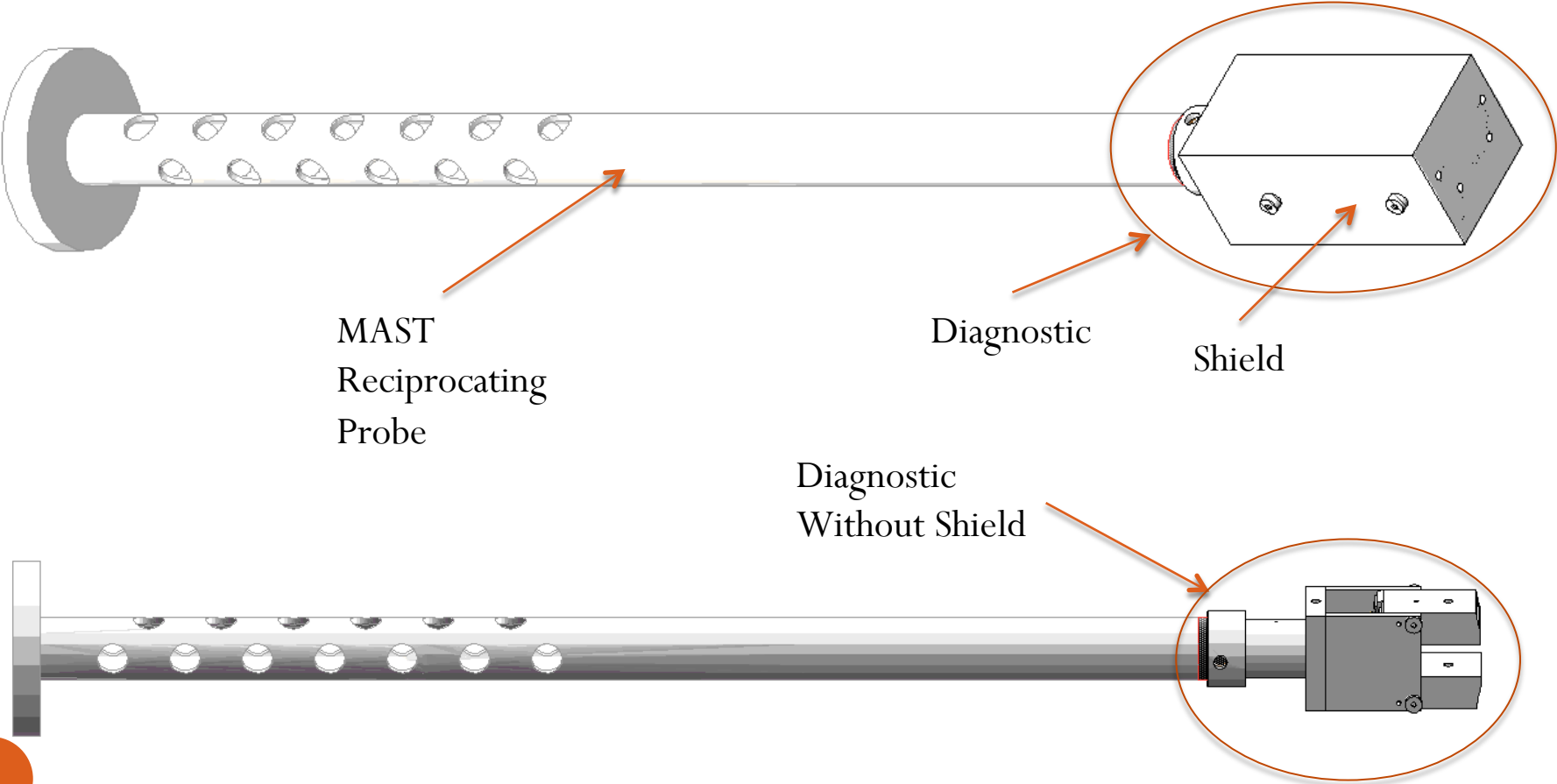
ISSUE: MAST DESIGN REGULATIONS REGARDING DIAGNOSTICS

IDEA: CONTACT MAST COLLEAGUES

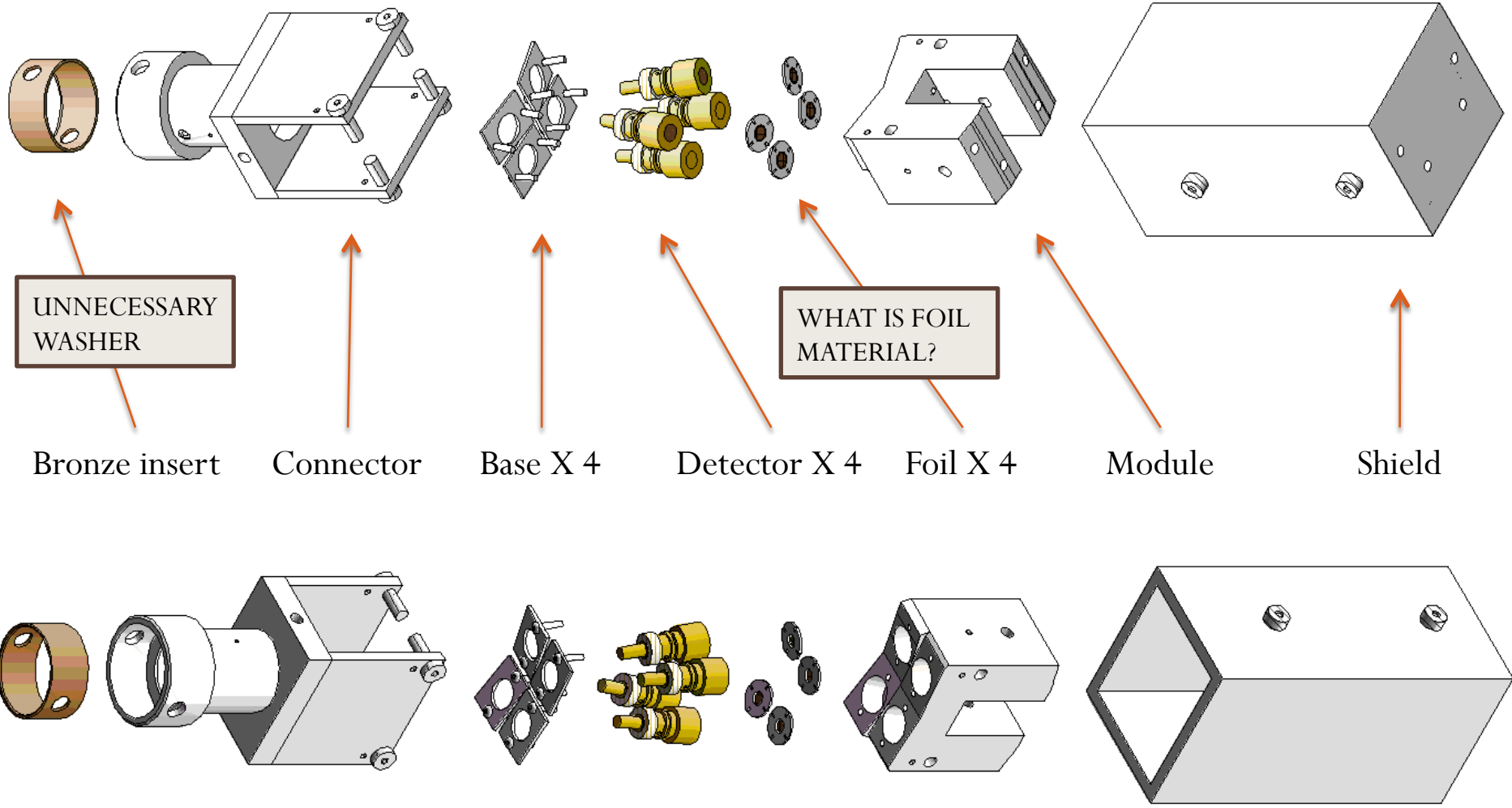
Total Assembled View

NOTE THAT SLIDE 14 HAS SHIELD COMMENTS

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Total Exploded View



UNNECESSARY
WASHER

WHAT IS FOIL
MATERIAL?

Bronze insert

Connector

Base X 4

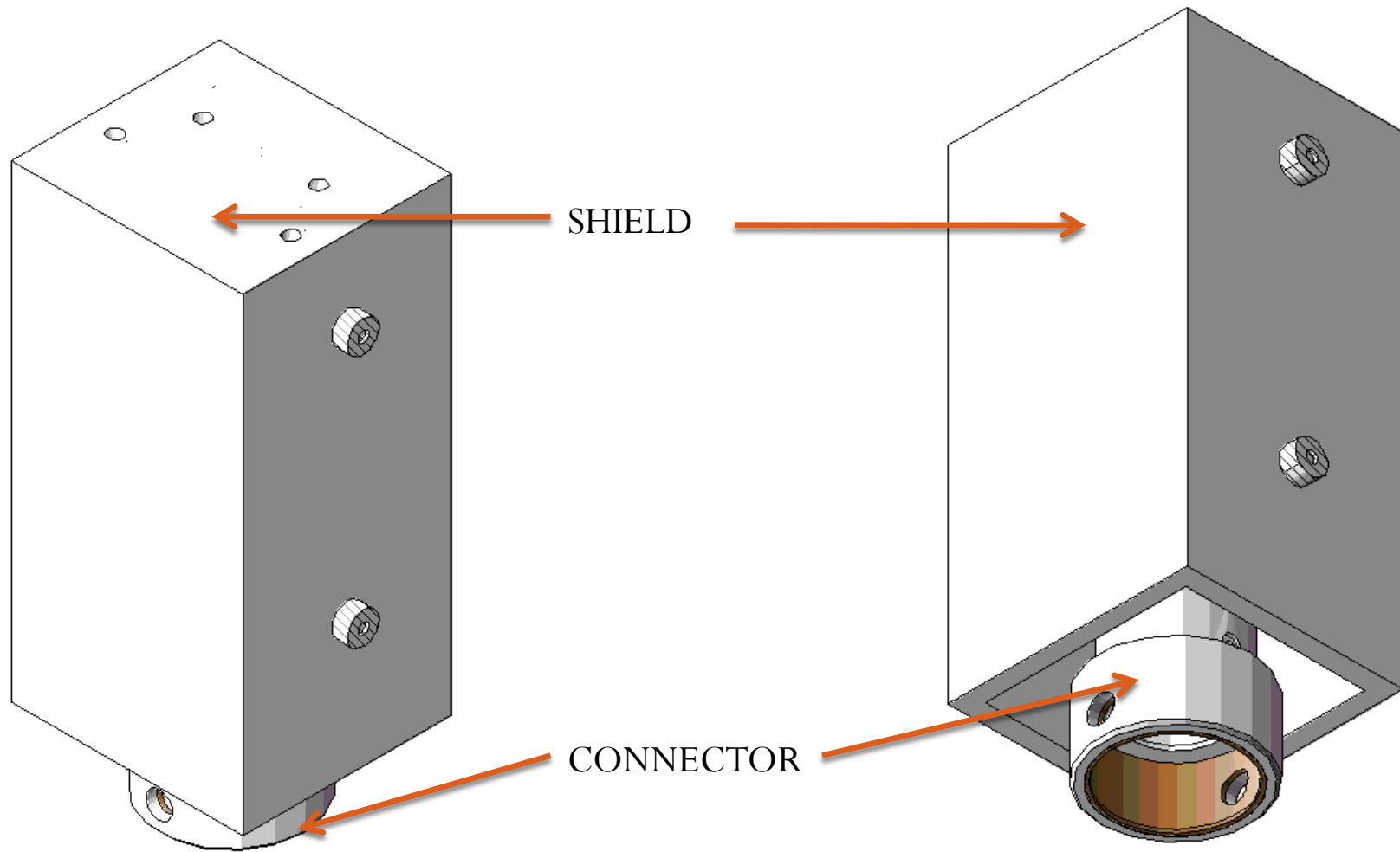
Detector X 4

Foil X 4

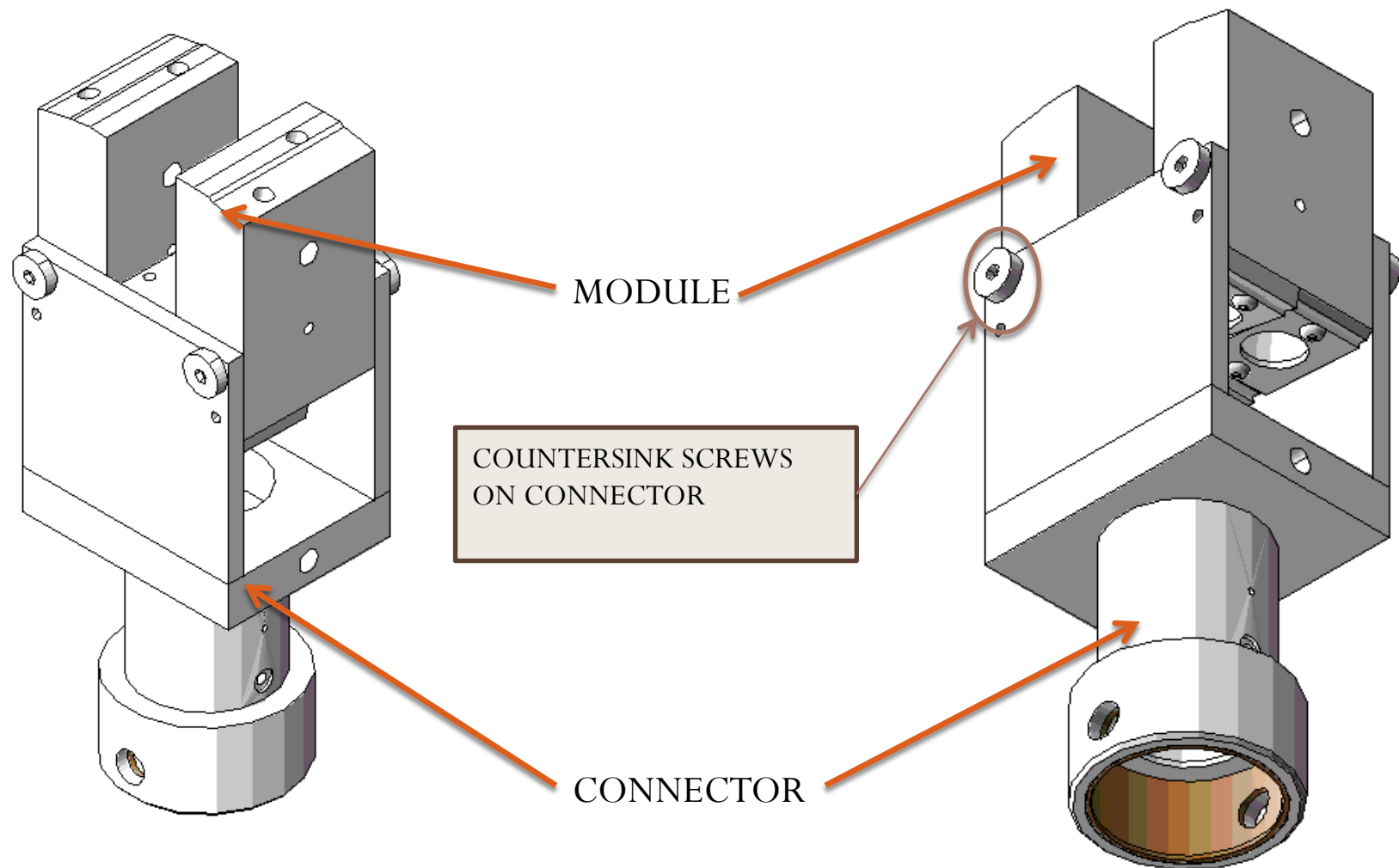
Module

Shield

Assembled View with Shield

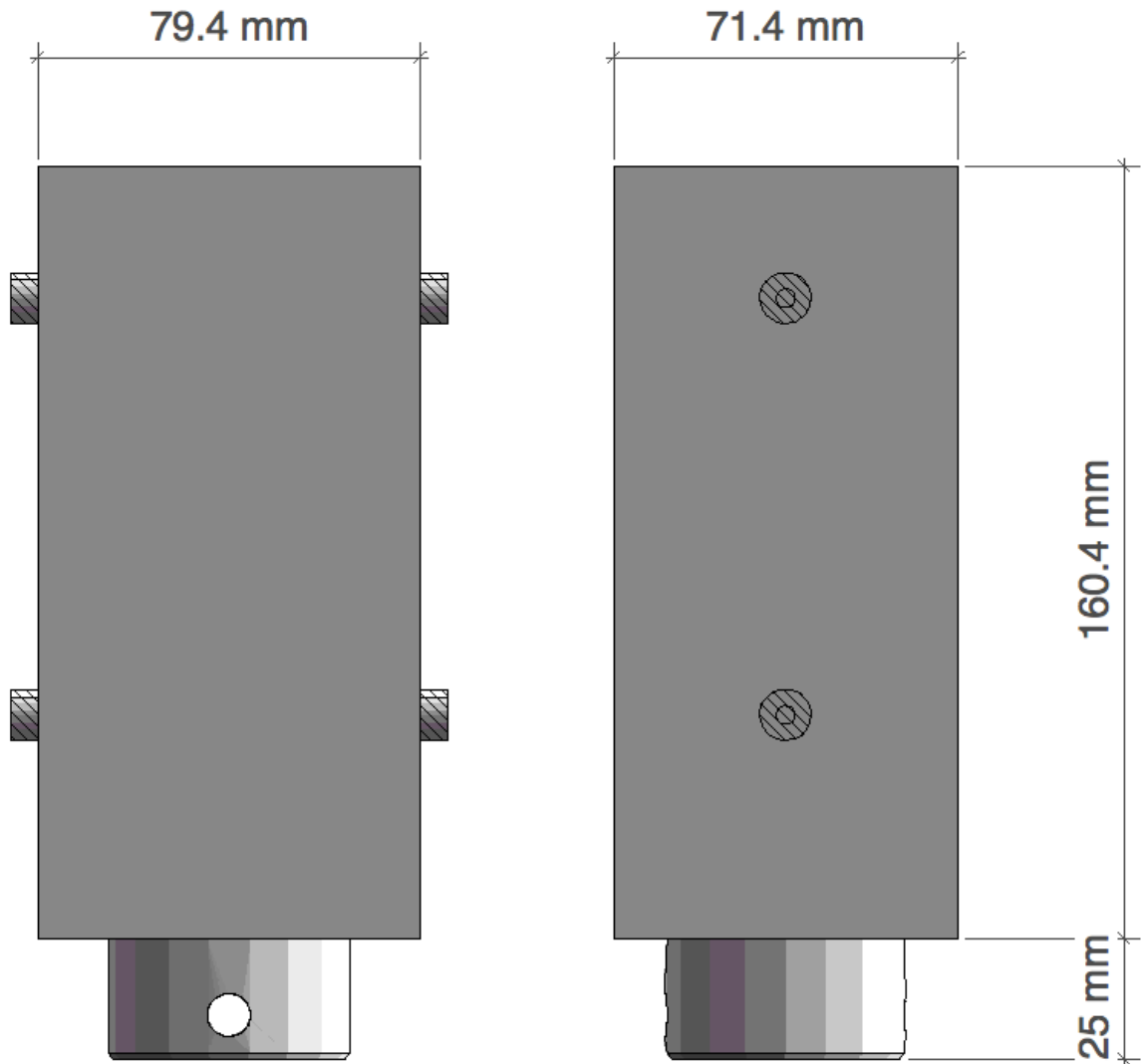


Assembled View without Shield

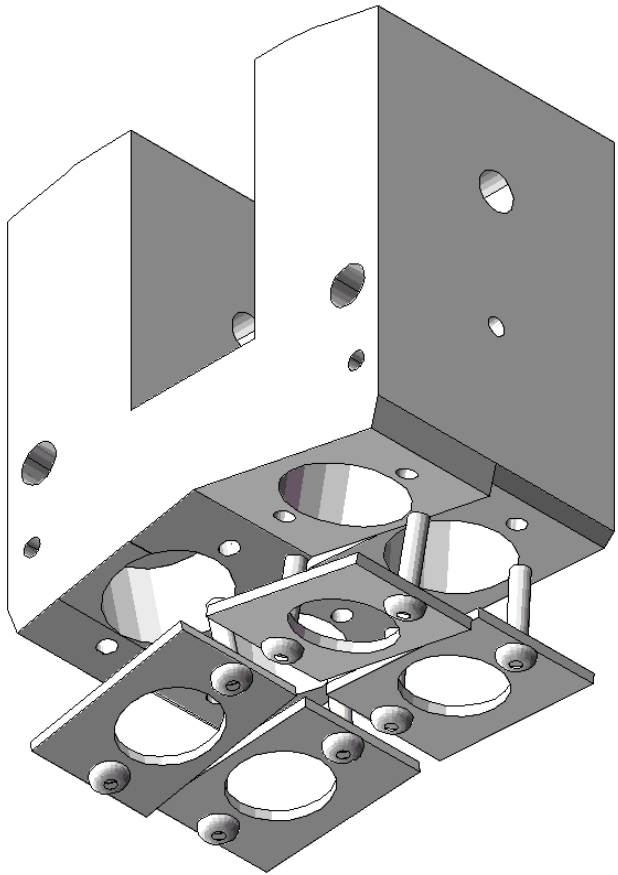
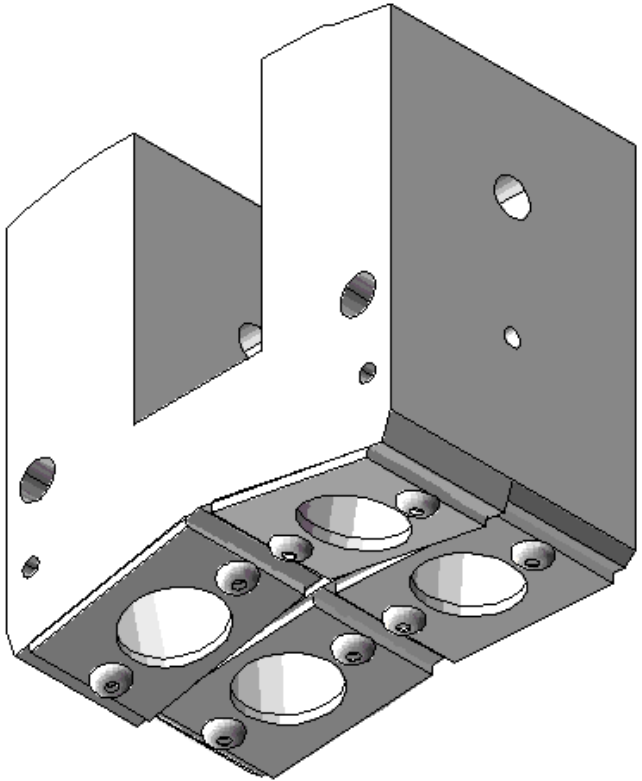
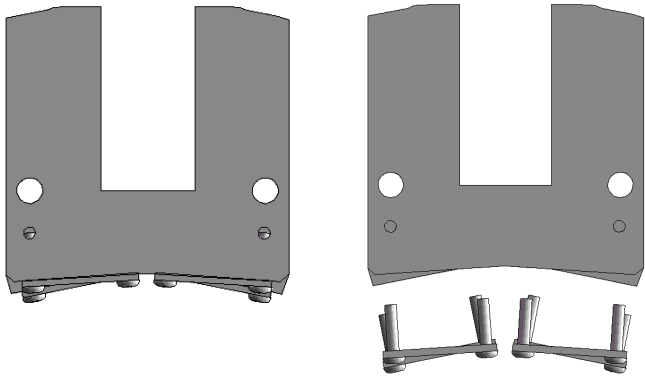


Total Assembled Dimensions

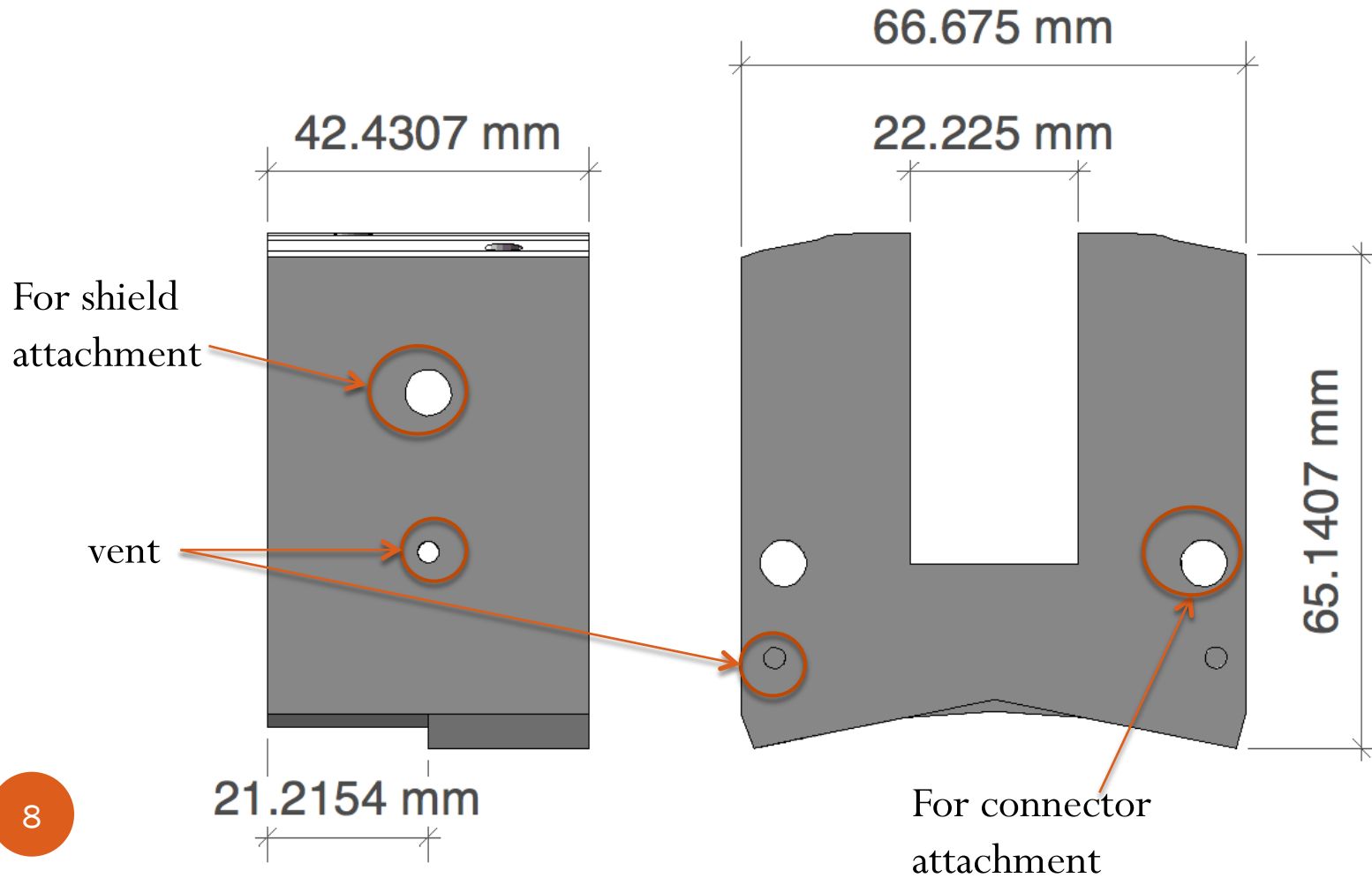
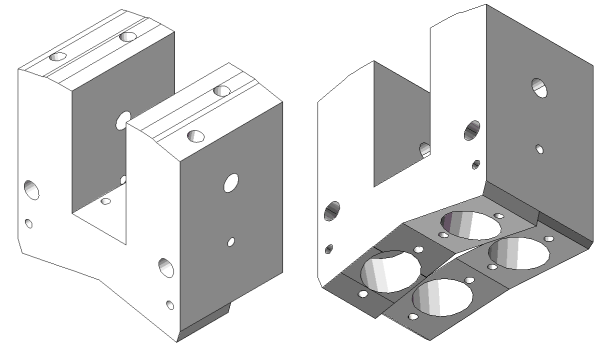
COMMENT 1
ISSUE: POSSIBLE
HARDWARE
COMPLICATIONS AT
MAST, FOR EXAMPLE
NEEDING TO REPLACE A
MACHINE SCREW
IDEA: CHANGE ALL
MEASUREMENTS AND
HARDWARE TO METRIC



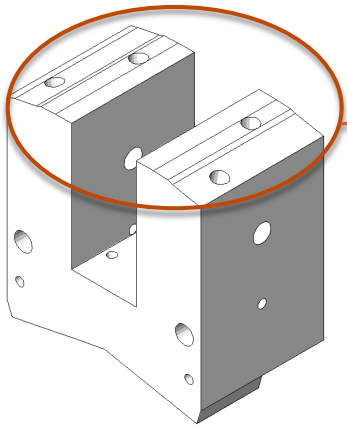
Module Exploded View with Bases



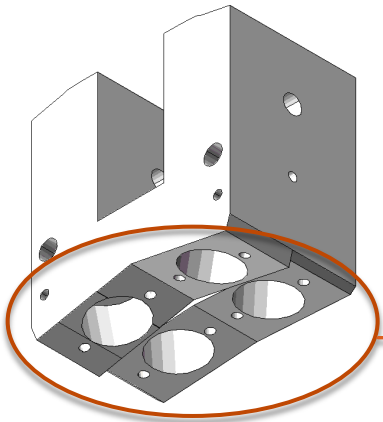
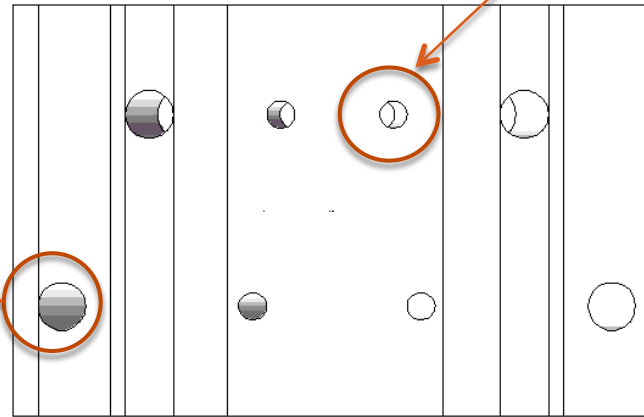
Module Dimensions



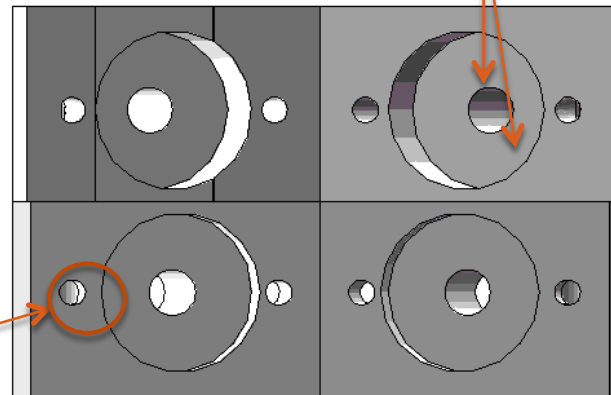
Module



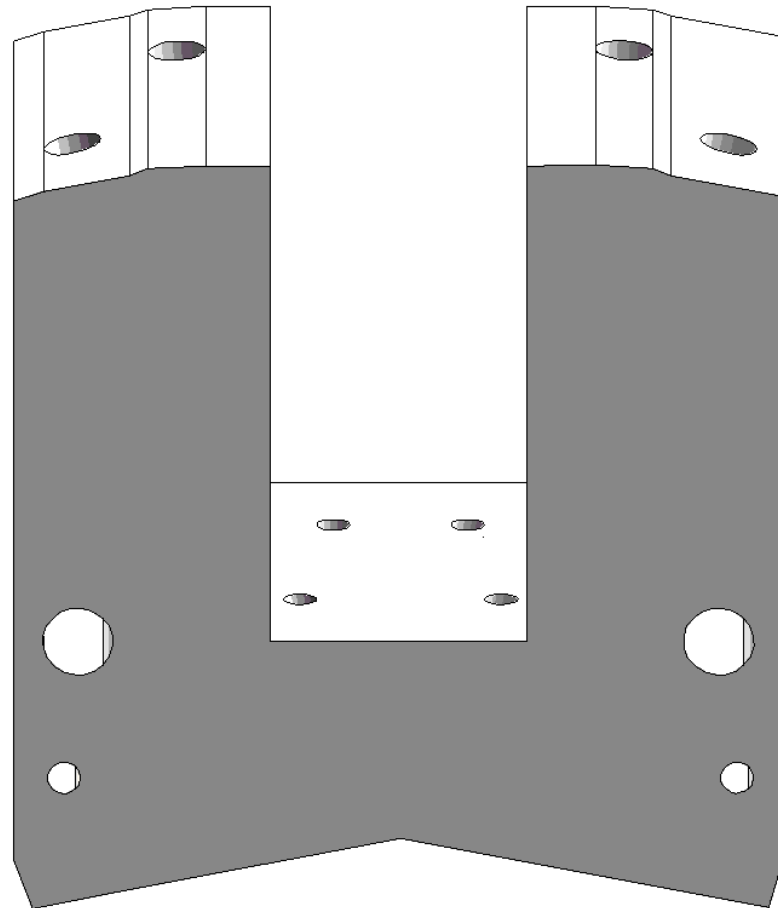
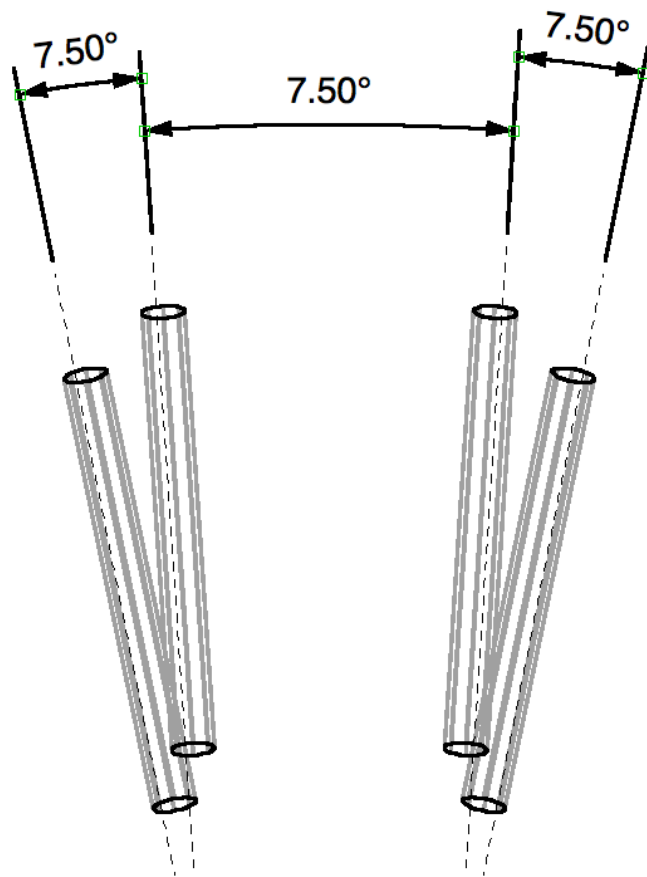
collimator
hole



detector and
collimator hole



Module Angles



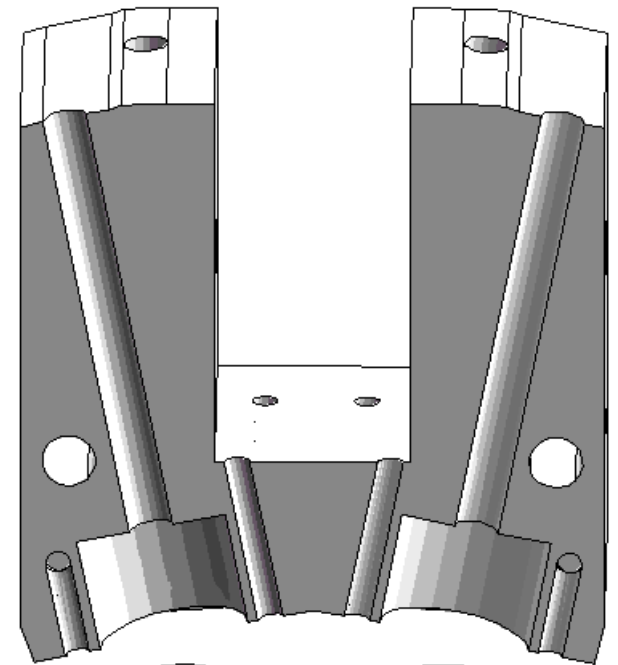
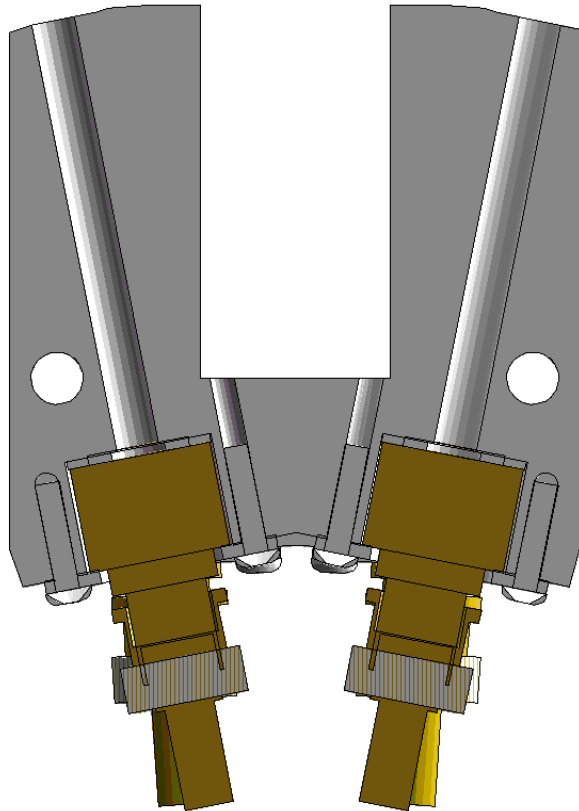
Module Cross Section

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

USE PEEK 100 TO INSULATE COMPONENTS NOT EXPOSED TO PLASMA;
DETECTOR INSULATION ENCOURAGED



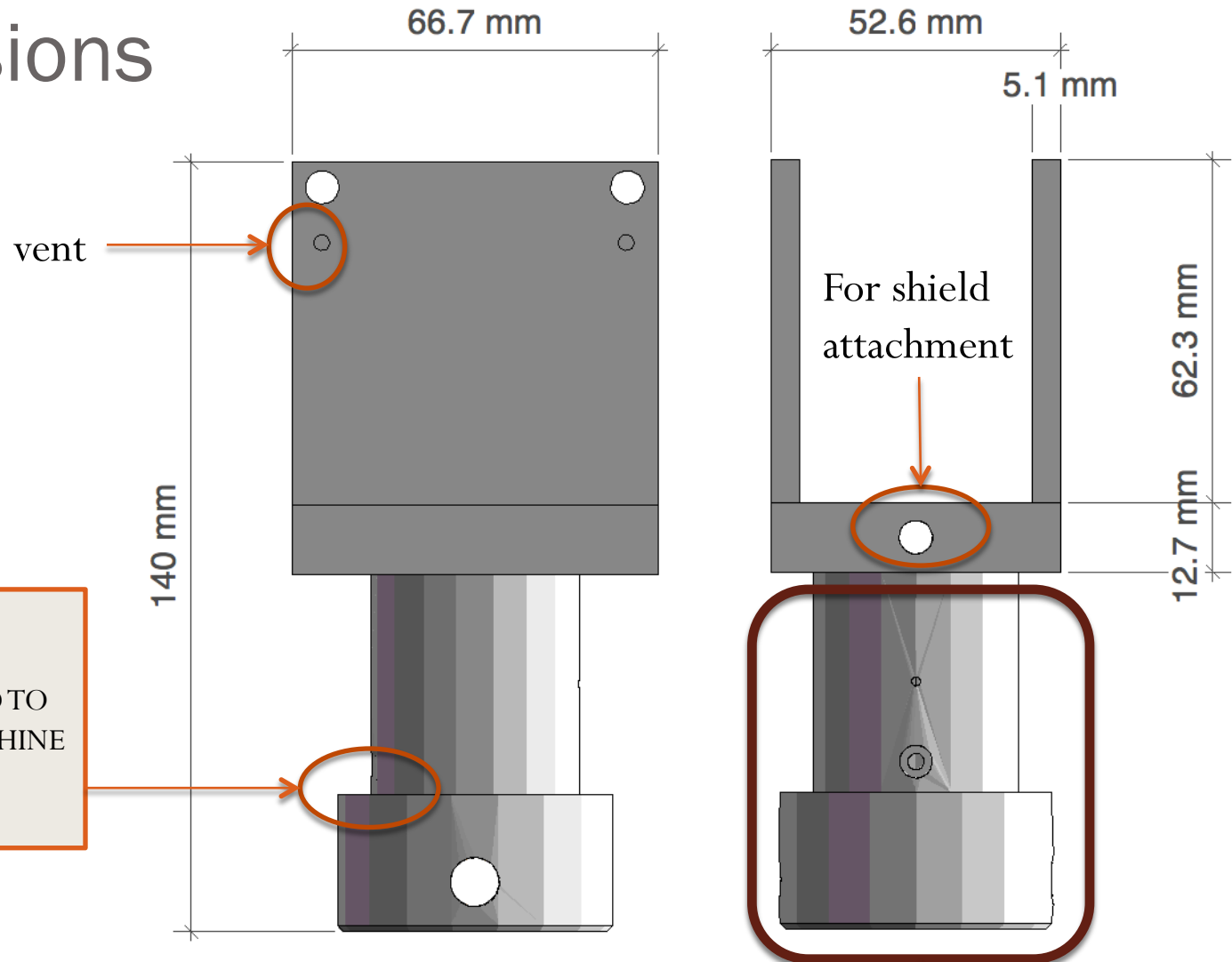
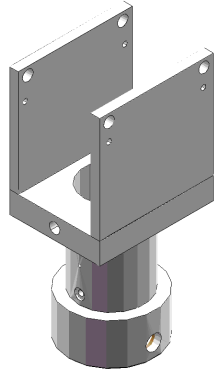
Foil

Detector

Base

BNC connector

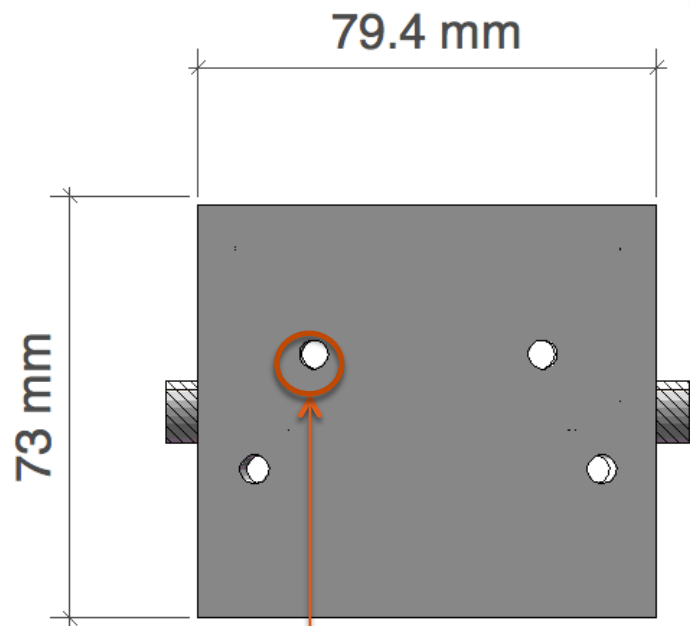
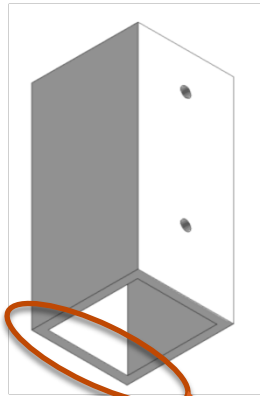
Connector Dimensions



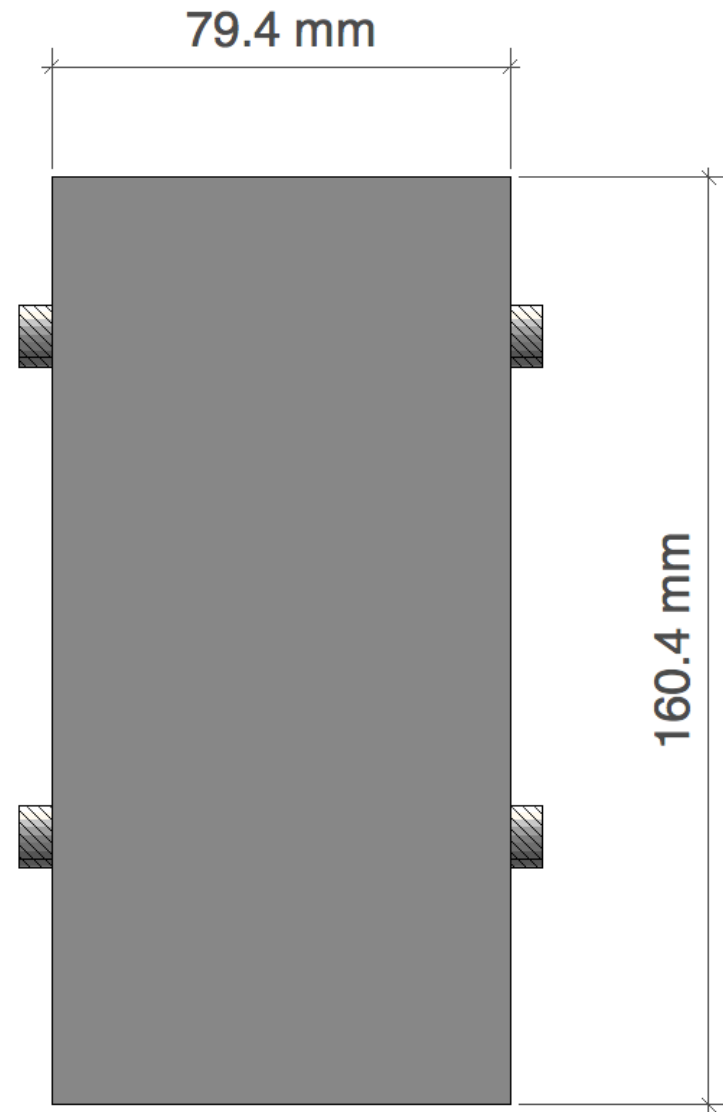
COMMENT 7
STATEMENT: THIS SHARP
EDGE WILL BE ROUNDED TO
REFLECT THE MAST MACHINE
DRAWINGS

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

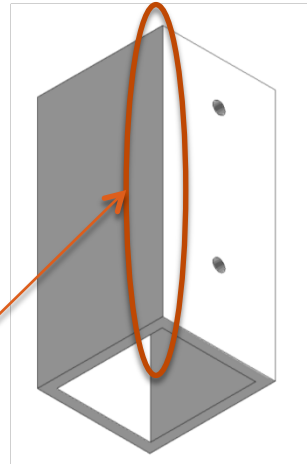
Shield Dimensions



collimator diameter: 5mm
wall thickness: 6.35 mm



Shield



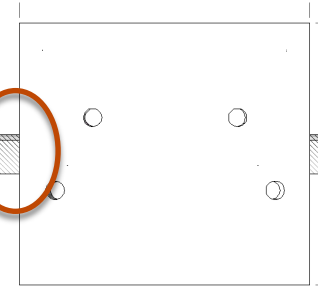
COMMENT 5

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

EITHER SHAPE IS FINE; CYLINDRICAL
CHEAPER TO MANUFACTURE



COMMENT 4

ISSUE: SCREWS NOT FLUSH WITH SURFACE
IDEA: COUNTERSINK SCREWS FOR SHIELD

COMMENT 3

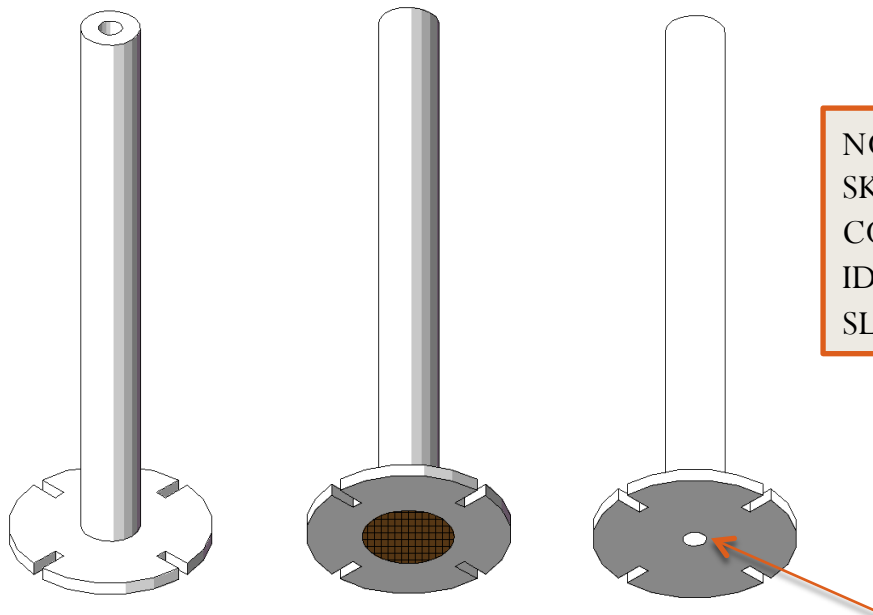
ISSUE: SECURE SCREWS TO BN SHIELD
IDEA: SPOTWELD SHIMSTOCK STRAP FROM
SCREW HEAD TO CONNECTOR OR USE
APPROVED UHV CERAMIC ADHESIVE

Alternate Washer to Change Collimator Size

COMMENT 10

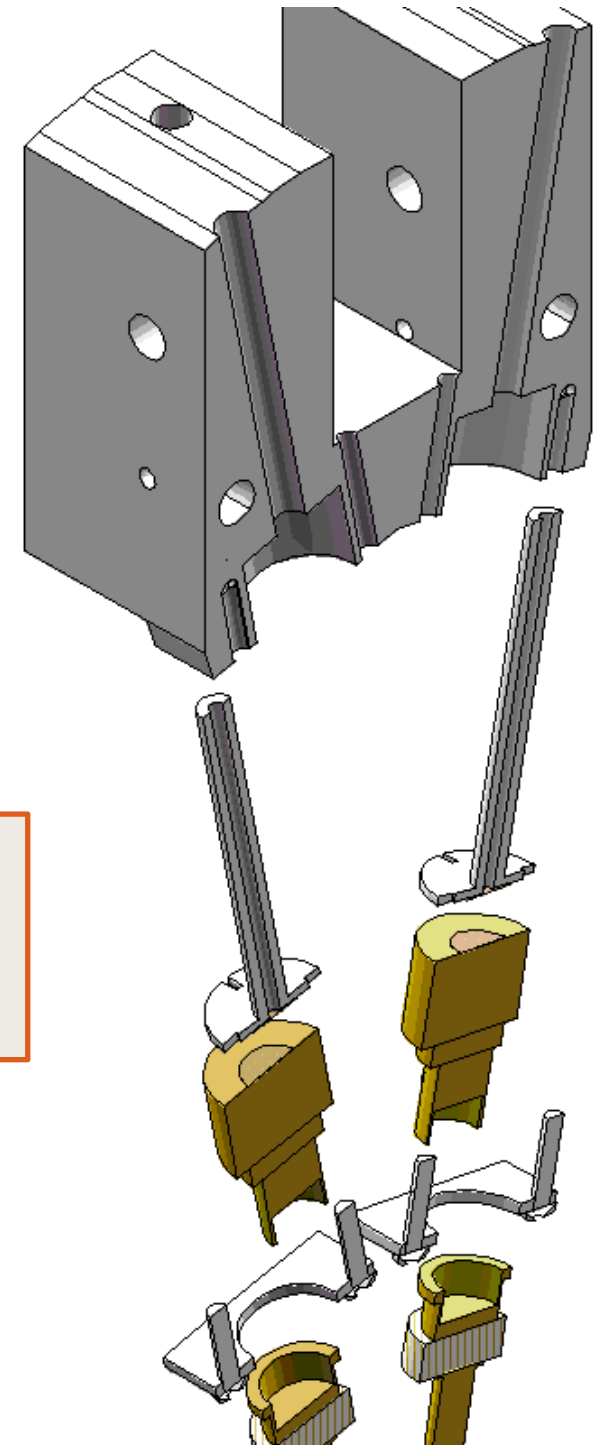
ISSUE: NEED ANOTHER WAY TO CHANGE COLLIMATOR SIZE, PREFERABLY ONLY REQUIRING THE REMOVAL OF THE BN SHIELD (UNLIKE METHOD SHOWN HERE)

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



NOTE THAT SKETCH FOR COMMENT 10 IDEA IS ON SLIDE 16

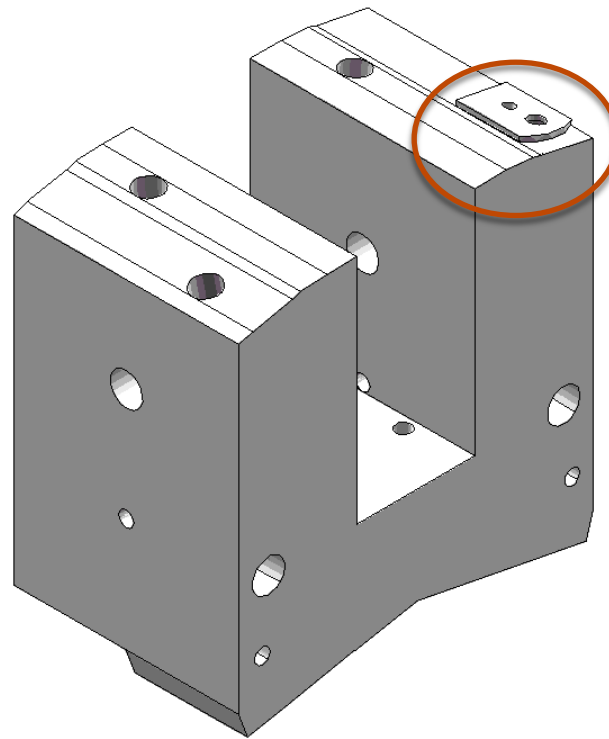
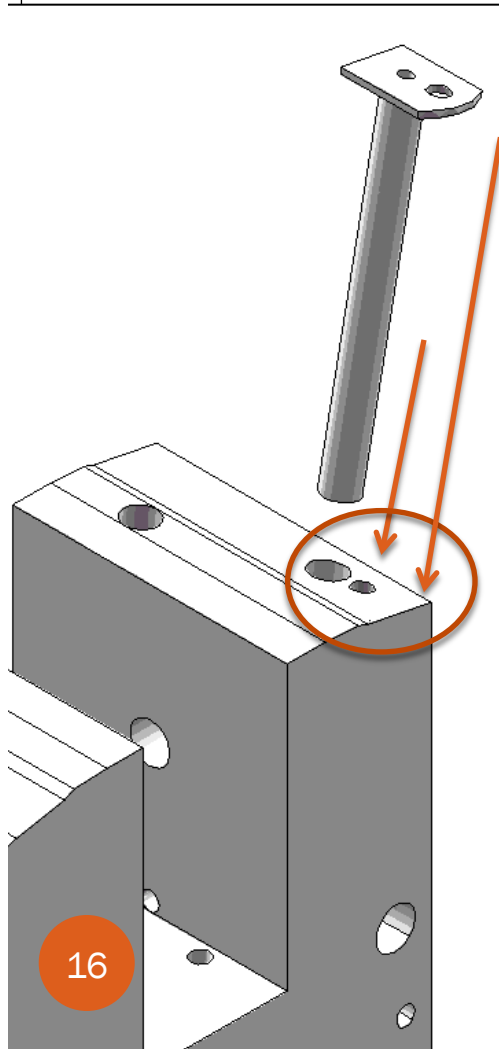
New collimator size



Alternate Washer to Change Collimator Size

SKETCH OF IDEA FOR
COMMENT 10

CONSIDER PLACING
SMALL LIP AT
BOTTOM OF SHAFT
FOR A MORE SECURE
FIT



New collimator size

