Chinese EMCal Module Prototype
Production and Plan

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The EMCal block design consists of scintillating fibers embedded in the absorber material, which is a matrix of tungsten powder infused with epoxy (W/SciFi).

The EMCal performance is central to the direct photon and upsilon measurements and it is also a key component, along with the HCal, of the jet reconstruction.
How to Build EMCal?

**EMCal Production Steps**

**Block Production** (UIUC, Fudan&Peking)
- Scint. fiber; Screens
- Create fiber-screen assemblies
- W powder; Epoxy
- Block casting
- Dimensional machining
- End-cut machining
- QA & testing
- Deliverable block (6144)
- Scintination testing
- pcbs; sipms; Light guides;

**Module Production** (BNL)
- Light guides; End reflectors
- pcbs W/sipms
- glue on light guides & end reflectors
- attach pcb w/ sipms
- Deliverable module (24×64=1536)

**Sector Assemble** (BNL)
- Mechanically Mount and Align
- Cooling
- Cabling
- Testing
- Sector box
- Install electronics
- Cabling, cooling
- Preamps and Interface pcb
- Deliverable sector (64)
How to Make the Blocks?

1. Fiber Assembly
2. Molds & Assemble
3. Powder Potting
4. Epoxy Cast
5. Demold & Machine
6. QA & Database No.
- Powder, Fibers, Screens, and Molds from UIUC.
- > 3 hours for first filling.
- ~ 1 hour after several times of training.
- Automatic Fiber Filling Machine (AFFM) is on the way.
- Molds sealed by Dow Corning Silicon Glue.
- Needs 24 hours to dry.
- The airtightness is good.
- S1: 4265 g powder potted in
- S2: 4245 g powder potted in
- Pipes sealed by 504 a&b Glue and Super Glue
- Air condition: 20 °C & 50%
- Stable air system will be built in new Lab
Two molds were casted.

Casting time was less than 10 mins for the Both.

The Fume Hood will be built in new Lab.

Epoxy was warmed by water bath of ~55°.
- The surfaces of the 1st sample (BL123-S1) and 2nd sample (BL123-S2) are good
- No fiber out
We can do:

- make block samples.
- Roughly machine and clean the molds.
- Light transmission testing.
- Formulating QA.
- Set-up Database.
Lab Readiness at Fudan

**We have:**
- Laboratory Readiness.
- GY Tungsten powder (from SINOPHARM Company).
- Epoxy 301-1.
- Screens (from BNL/UIUC).
- Fibers from Kuraray.
- Molds, Module No. from 19 to 24 (Drawings are almost down by Yang).
Total 6144 blocks for EMCal

- ~20%, Module No. 19-24 (0.8<|\eta|<1.1), are planned to make in China
- ~10% blocks will be made in Fudan (Peking Uni.).
Samples for Module No. 19-24 will be made and tested in next few Months.

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Prof. Siguang Wang from Peking Uni. visited Fudan in January.
He participated in the sample production and was trained for all the flow.
Peking Uni. will start the sample production in the same time.
Lab readiness.
Materials readiness (same as Fudan).
Thanks

Thanks the supports from BNL and UIUC