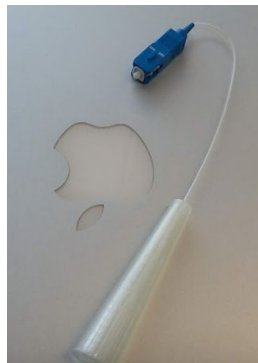
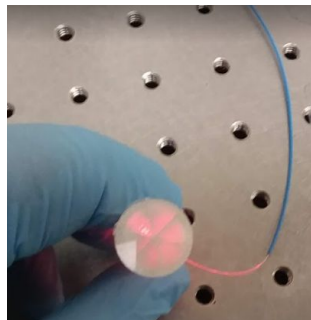


Update on using 3D printer for coupler to SiPM

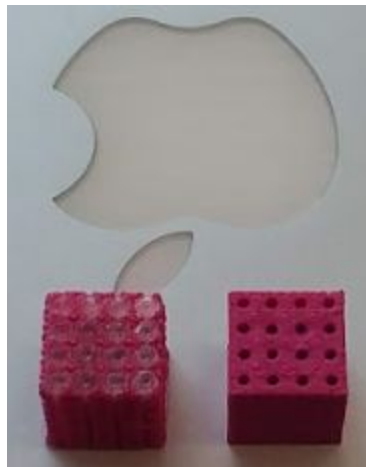
Steve Kuhlmann, Tom Lecompte, Jeremy Love(ATLAS), Argonne



x5 scale
diffuser with
fiber inserted



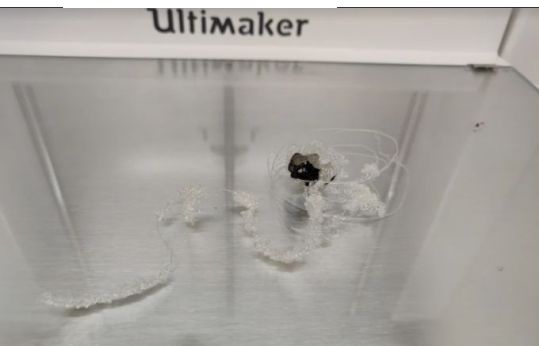
x5 scale diffuser
with fiber
inserted and red
laser illumination



SiPM-scale model
couplers with and w/o
the diffuser

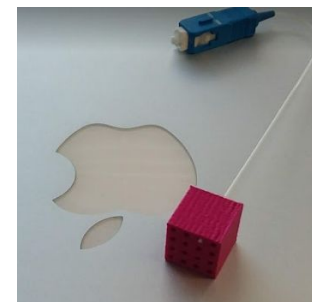


Laser pointer thru one of the
“transparent” diffusers



Oops. No idea what happened

SiPM-scale models take 60min to
print with diffuser and 30min w/o



SiPM-scale model w/o the
diffuser, and fiber inserted

While I can now print w/o Jeremy's help, limited to 5-10 prints per week until we get Covid-approval (was 1-2 per week if Jeremy did the printing)

Dozens of printing parameters, mostly trial and error now

Basic mechanical structures are close, focus turning to changing parameters to improve transparency

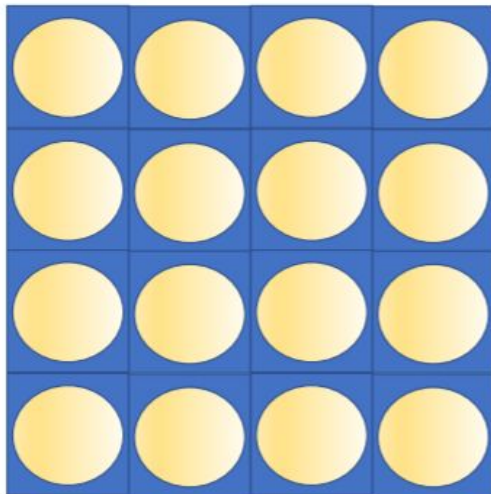
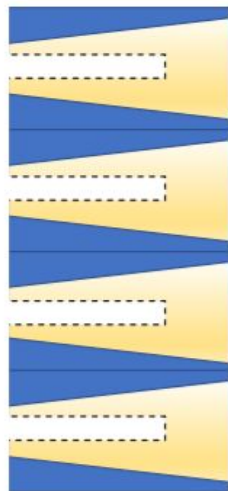
Have not found documents yet with SiPM face response or possible saturation levels, to motivate diffuser



Backup slides follow



Original cartoon



One piece or
possibly 15 pieces
in a frame

Almost certainly has
more material outside the
4x4 square for ease of handling



Printer=Ultimaker S5

Materials used so far:

White PLA

Transparent PLA

(PLA = Polylactic Acid)



[Introduction](#)[Installing CadQuery](#)[CadQuery QuickStart](#)[CadQuery Design Principles](#)[CadQuery Concepts](#)[CadQuery Scripts and Object Output](#)[CadQuery Examples](#)[CadQuery API Reference](#)[String Selectors Reference](#)[Combining Selectors](#)[CadQuery Class Summary](#)

CadQuery 2.0 Documentation

CadQuery is an intuitive, easy-to-use Python library for building parametric 3D CAD models. It has several goals:

- Build models with scripts that are as close as possible to how you'd describe the object to a human, using a standard, already established programming language
- Create parametric models that can be very easily customized by end users
- Output high quality CAD formats like STEP and AMF in addition to traditional STL
- Provide a non-proprietary, plain text model format that can be edited and executed with only a web browser

See CadQuery in Action

This [Getting Started Video](#) will show you what CadQuery can do. Please note that the video has not been updated for CadQuery 2.0 and still shows CadQuery use within FreeCAD.

Quick Links



Ultimaker S5 < 1 Ultimaker White PLA AA 0.4 2 Ultimaker Transparent PLA AA 0.4 < Fine - 0.1mm 20% Off On

Trying to print x1 and x5 scale objects at the same time gave gcode compile errors (now 1 object at a time)



Object list

- cq_box_16holes_x1.amf
- cq_box_16holes_x5.amf
- cq_box_16poles_x1.amf
- cq_box_16poles_x5.amf
- cq_cone1_x1.amf
- cq_cone1_x5.amf

UMS5 cq_box_16holes_x5
114.9 x 84.5 x 50.0 mm



Ultimaker

22 hours 25 minutes

72g · 9.05m

Preview

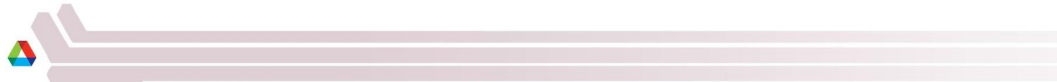
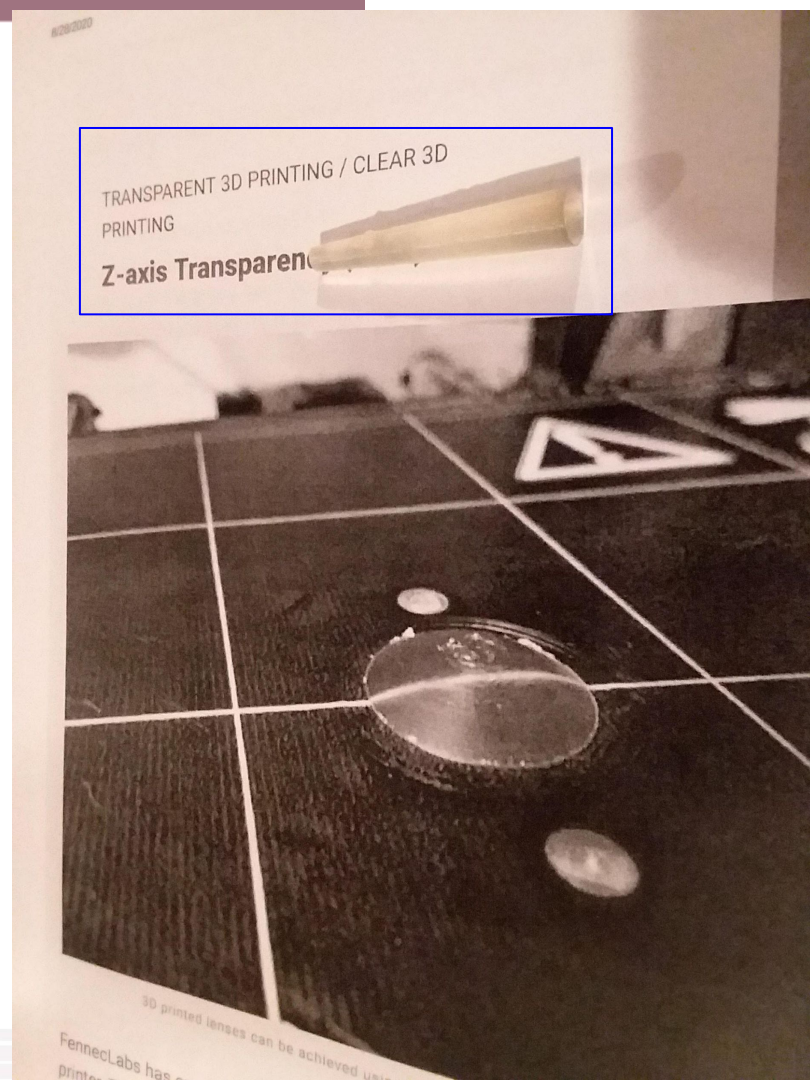
Save to File

First x5 scale cone with hole for fiber


Some black residue from previous printer usage, Jeremy says a repeat cone print would have been fine.
More on optical quality on next slides

Did not notice brittleness, but if it's a problem "Tough PLA white" available

Main issue is that fiber hole is covered on the end (can see a partial open tube on inside of cone)



A lot of information about optical-quality 3D printing




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Pay Attention

Transparent/Clear 3D Printing: 4 Ways to Do It

 by Benjamin Goldschmidt
Aug 2, 2019



A lot of information about optical-quality 3D printing

Our applications engineer Amos Dudley took on the challenge and created the first fully 3D printed, interchangeable lens camera, produced entirely on a [Formlabs SLA 3D printer](#).

