MAPMT Magnetic Field Test Update

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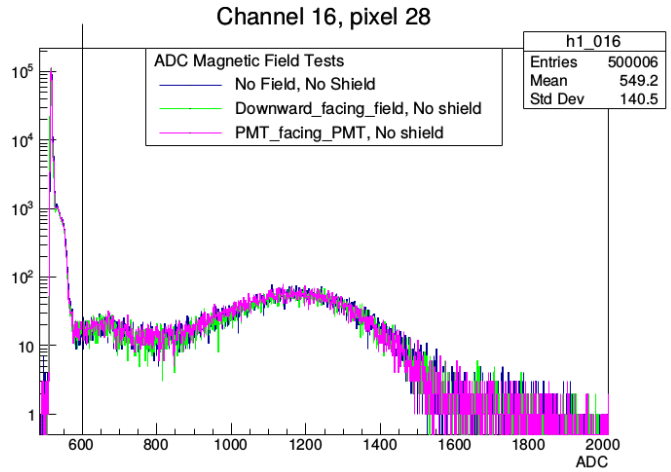
Overview

- relative efficiency $= \frac{\text{events above pedestal in a given run}}{\text{events above pedestal in the control run}}$



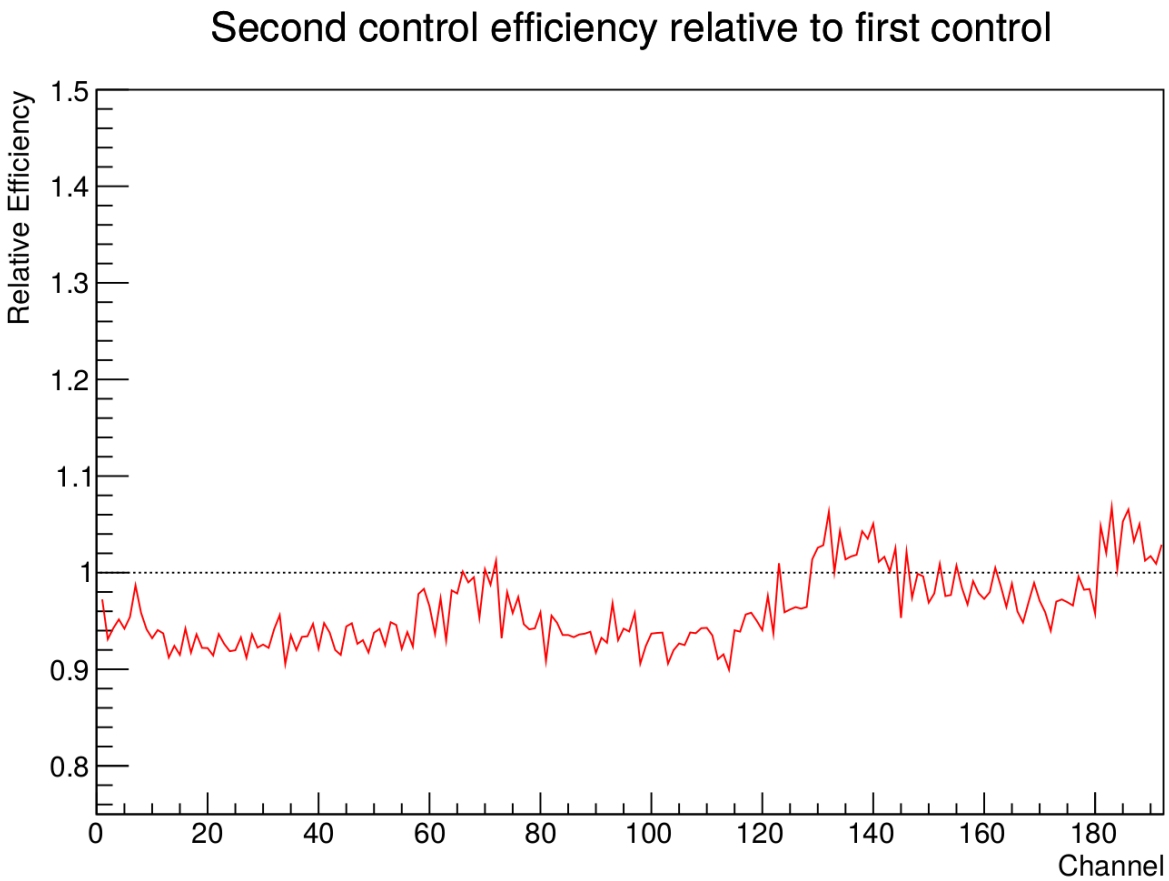
- Compare our two control runs by cahnnel
- effects of the field by channel
- effects of the shield with the strongest field setting by channel

Field orientations, "Field facing PMT"

Figure: Units listed are in gauss and correspond to the field strength achieved with our 3A setting. Orientation 1, "field facing PMT" (left). Orientation 2, "field facing down" (right).

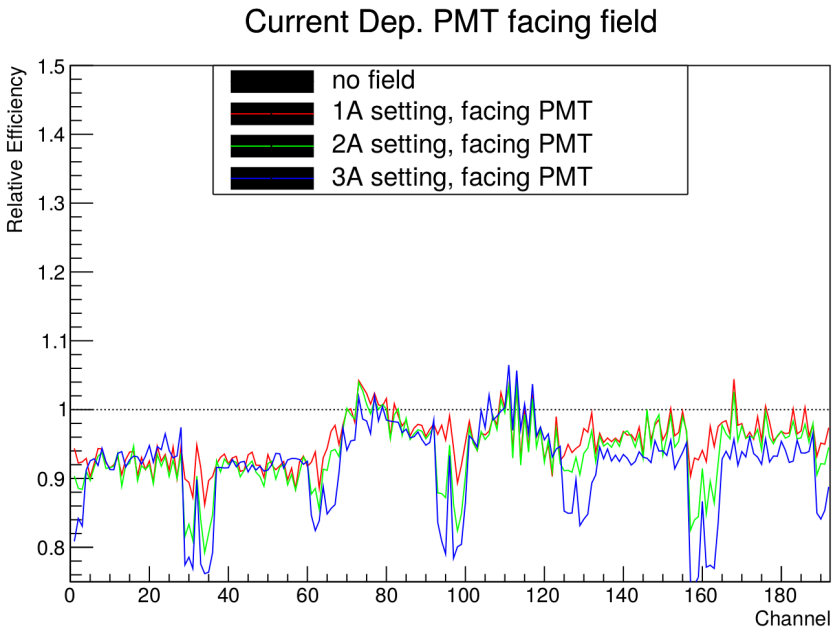
expected field strength in the PMT region is 15-25G (which is exceeded during some of our tests). An additional orientation is planned for when we have access to the laser test set up again.

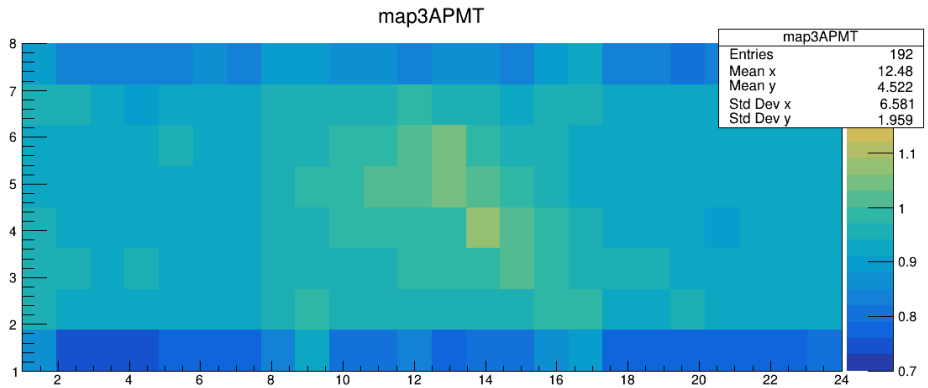
Comparing control (no field, no shield) runs



variation is unexpectedly high in many of the channels $\rightarrow$ some systematics to be tested when we have access to the test setup again.

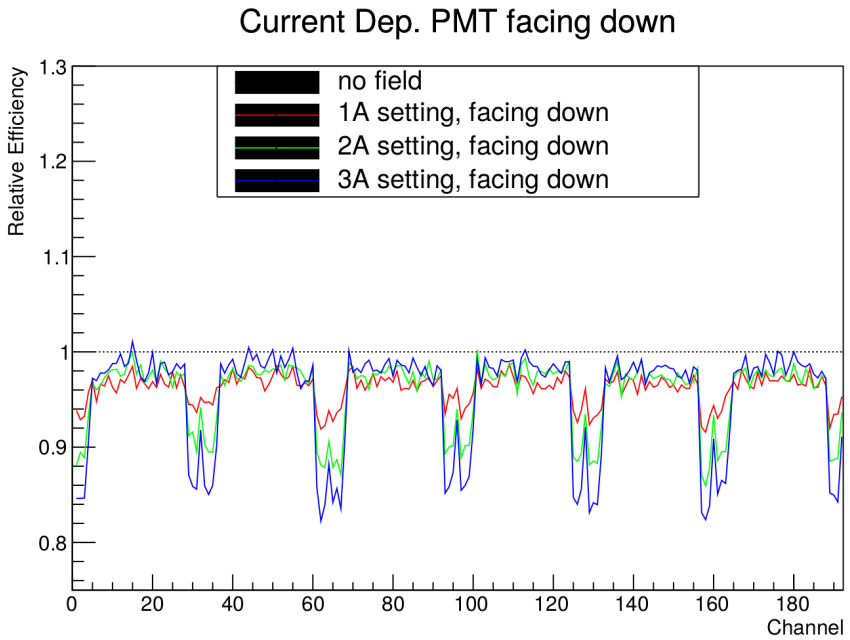
Orientation 1 field strength dependence

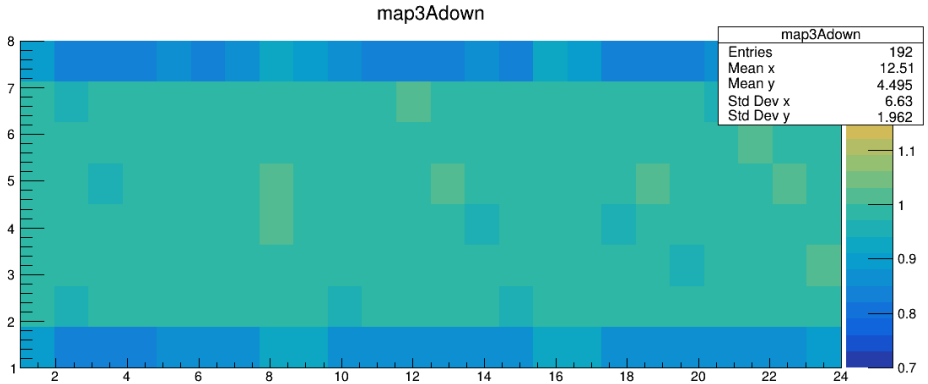




Pixels along the top and bottom edge have the largest change in relative efficiency

Orientation 2 field strength dependence





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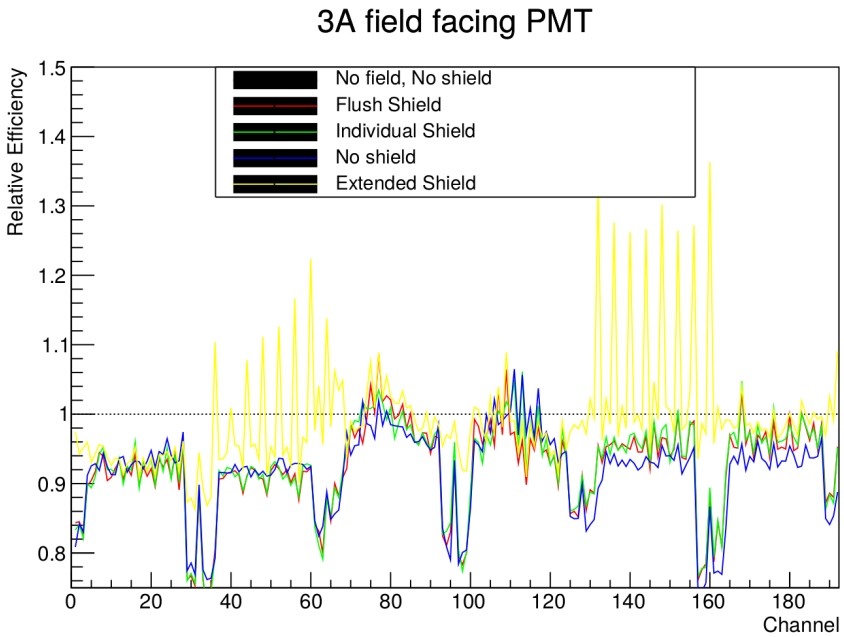
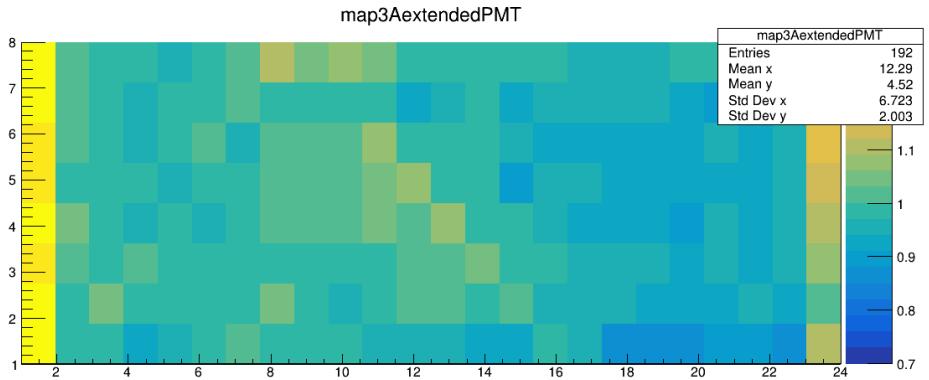
Orientation 1 shielding results (3A setting)





Local shielding has minimal to no effect on the relative efficiency (with the exception of the unrealizable extended shielding). The extended shielding does recover the efficiency along the top and bottom rows, while we believe the effect on the leftmost and rightmost columns are cause by reflections off of the shield.

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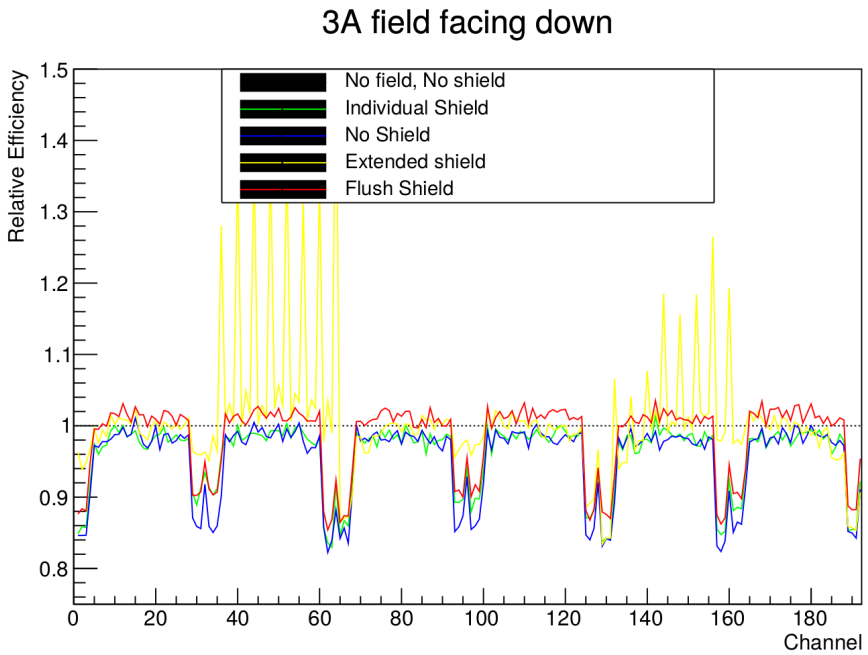

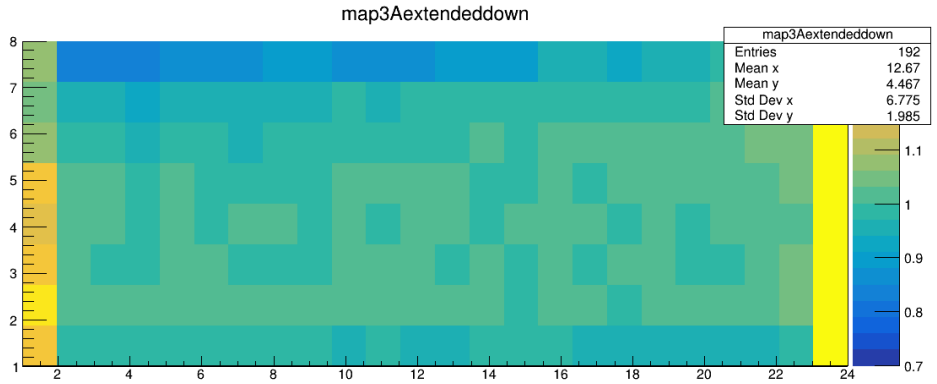

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Conclusion

- The magnetic field effects the pixels along the outer edge of the MAPMT module, with a change in the relative efficiency of up to 75% in our test setup
- The local shielding (that could be installed) has very little effect on the MAPMT performance.