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PMT Response Cutoff

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A photomultiplier tube* was tested to determine its effective light detecting edge. This was done using a laser light source and a light tight box.

The light tight box was constructed in such a manner that an aperture of 1 mm was present in the front of the box allowing a small bit of light through to the PMT inside.

The light source was a He-Cd laser (442 nm). The laser beam was directed onto a white spot held out at the focal point of a concave mirror. The spot diffused the beam, and the mirror redirected the rays into parallel light beams directed at the box containing the PMT. (See Fig. 2).

The PMT, mounted with a scale along its face, was placed into the box in such a way that its face was touching and parallel to the box' front surface. Readings of the PMT's current output were made when exposed to incoming light. Attempts were made not to allow current above 100 μ A (spec. limit). The tests were made at various points along the surface starting from the centre of the tube, working out to one side. The tests were done closer together as moved out. There was no field compensation added, but care was taken that all orientations were very similar, especially near the edges. The tube was then rotated 45 degrees and readings again done in a similar fashion. This procedure was repeated until the entire 360 degrees was tested.

The current output was plotted against the PMT's arc length scale (see graphs 1-8). When the arc length scale was converted to a projected scale (see Table 1 & Fig. 1), it was determined that the PMT was effective almost completely out to its outer edge, its cutoff point happening around 9.8, 9.9 cm.

* model #: R1408
serial #: CA276

1980-1981

TABLE 1: Comparison between Arc Length Scale and Projected Scale

Arc Length Scale (cm)	Projected Scale (cm)
0	0
2	2
4	3.9
6	5.8
8	7.5
8.5	7.9
9	8.2
9.5	8.6
10	8.9
10.5	9.1
11	9.3
11.5	9.5
12	9.7
12.5	9.8
13	9.9
13.5	9.93
14	9.95

FIG. 1: Comparison between Arc Length Scale and Projected Scale

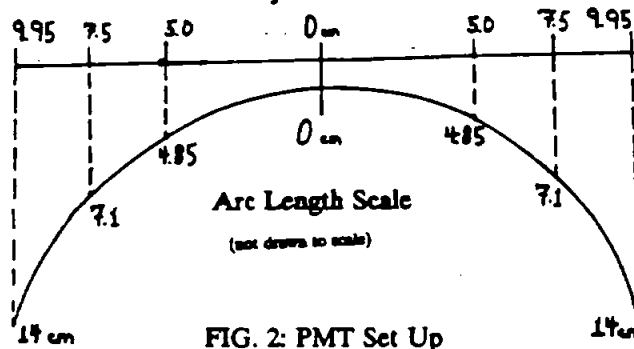
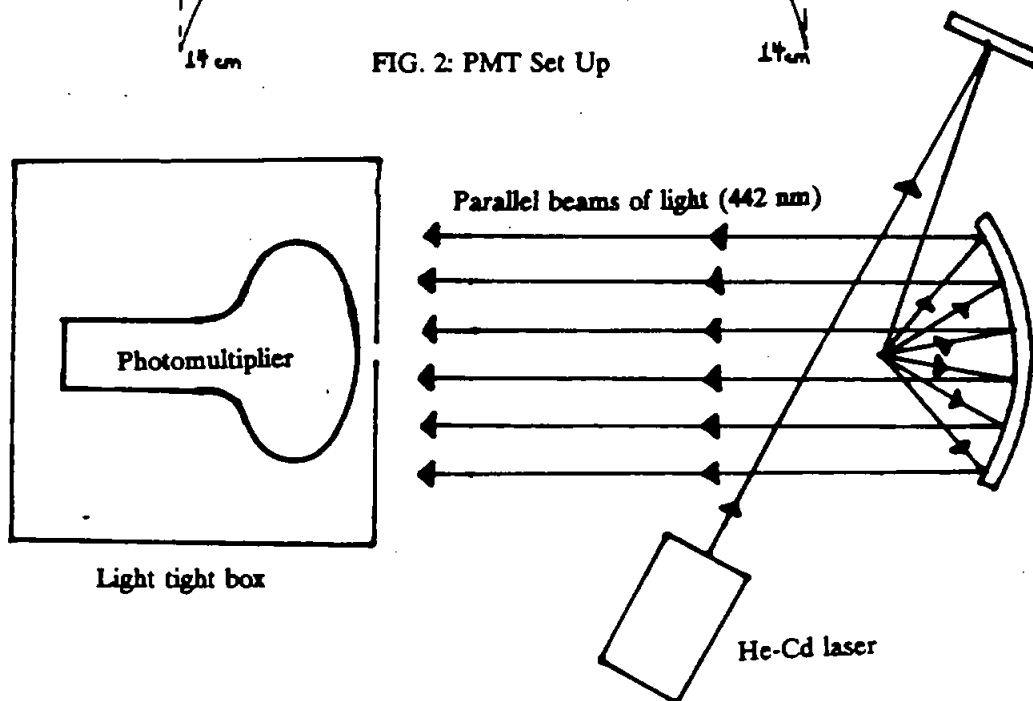
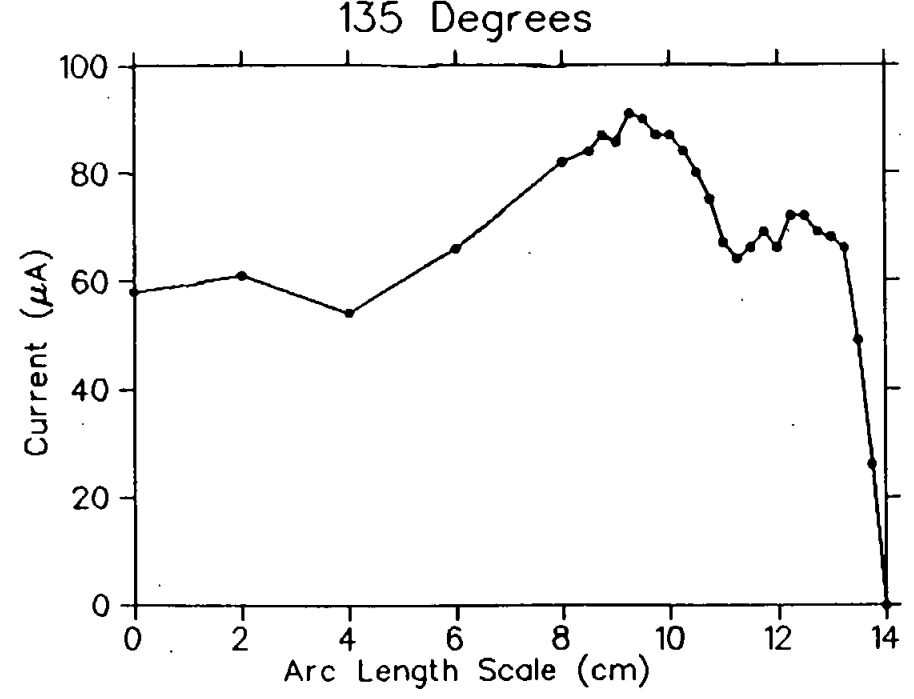
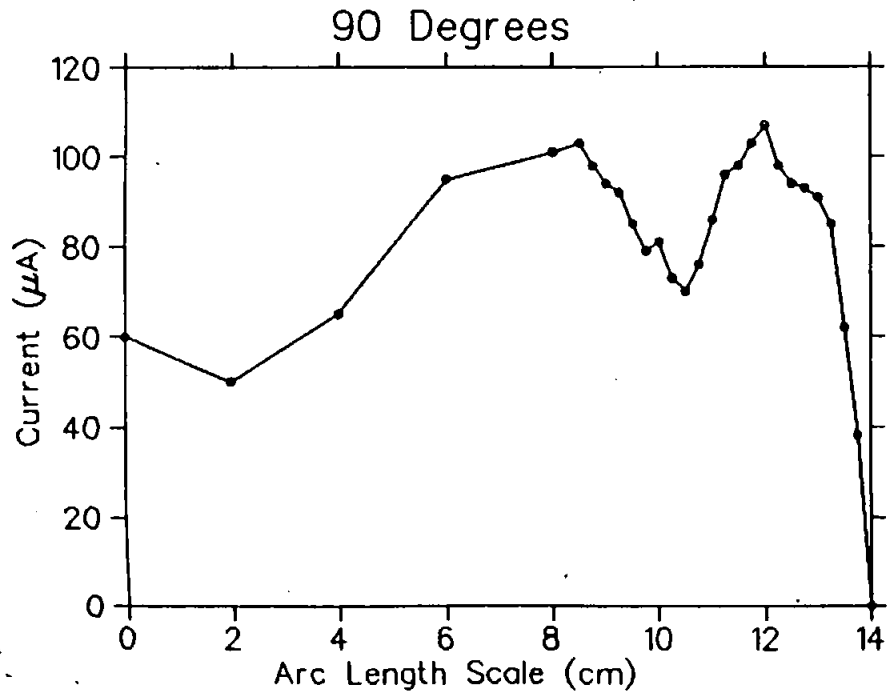
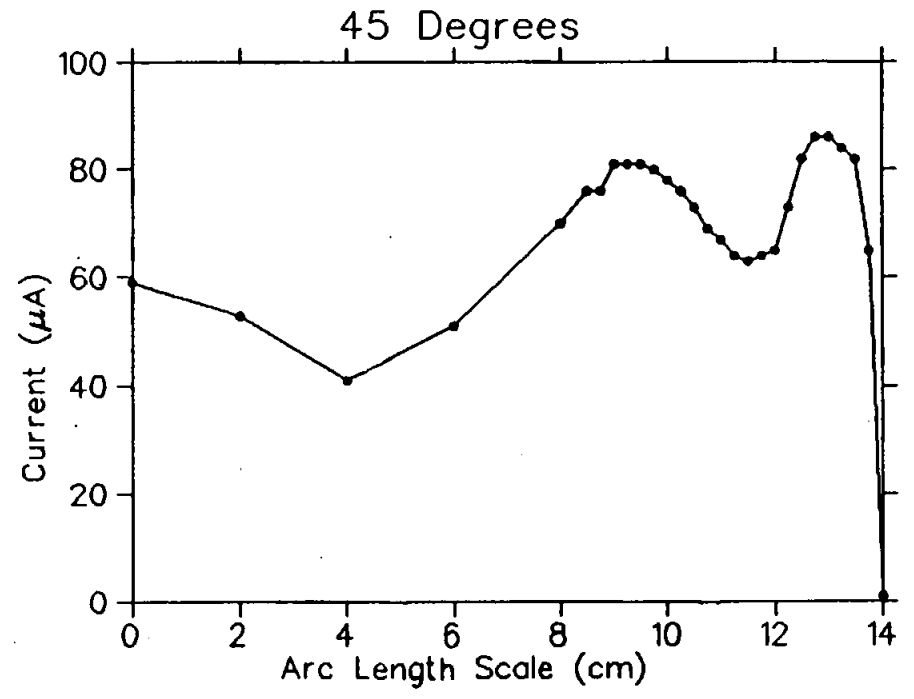
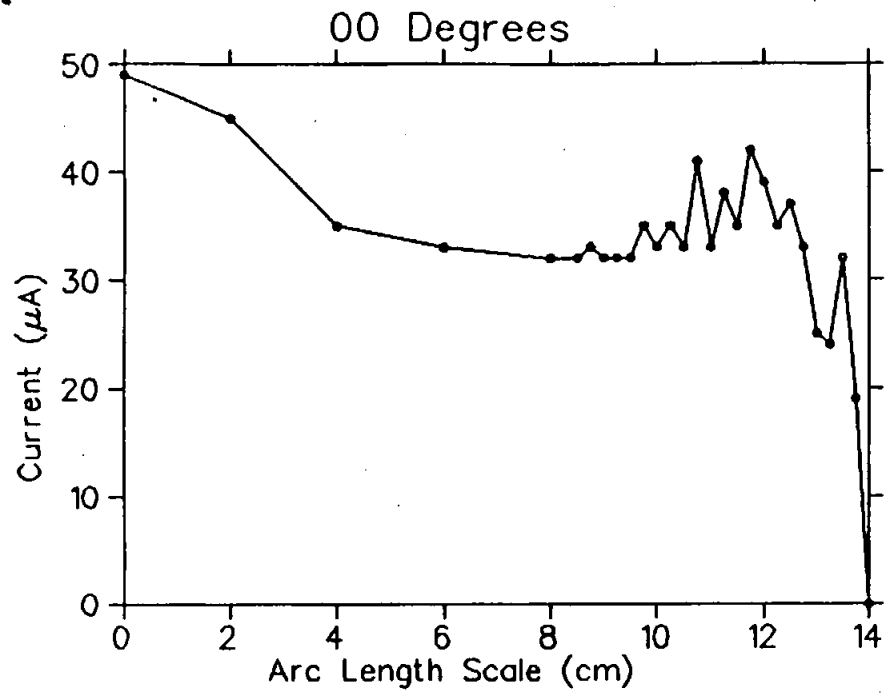


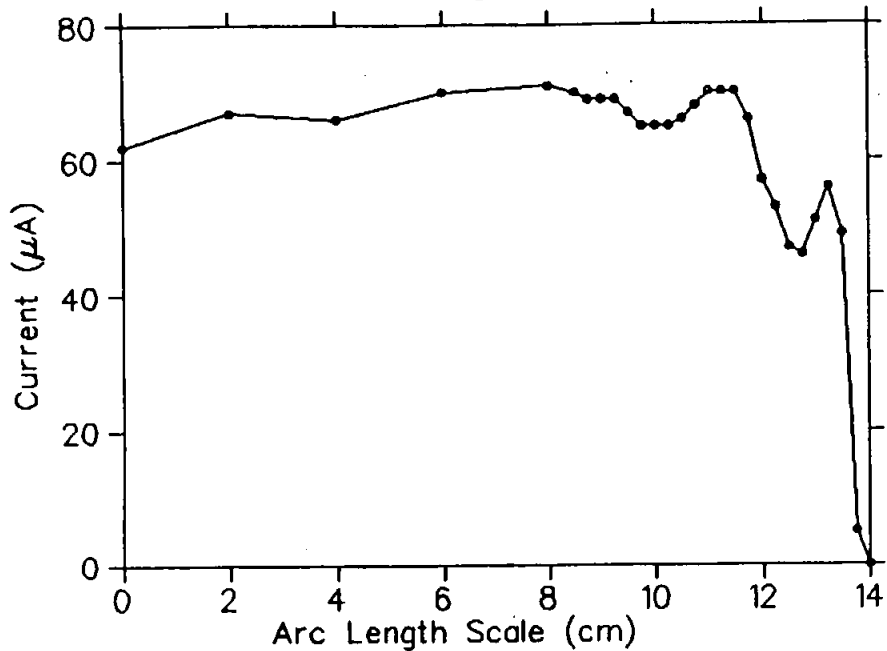
FIG. 2: PMT Set Up



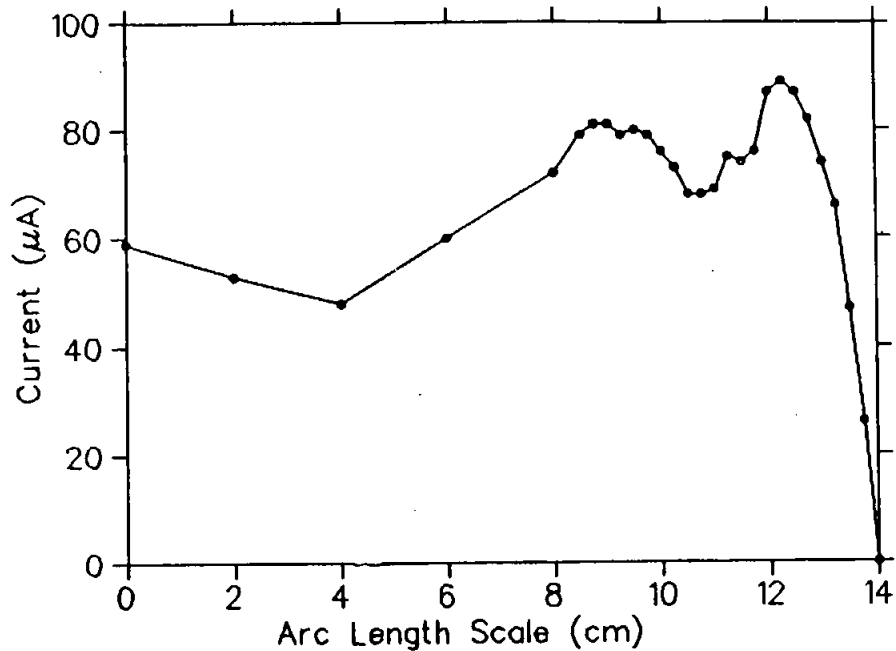


θ = ORIENTATION OF SCAN W.R.T. DYNODES

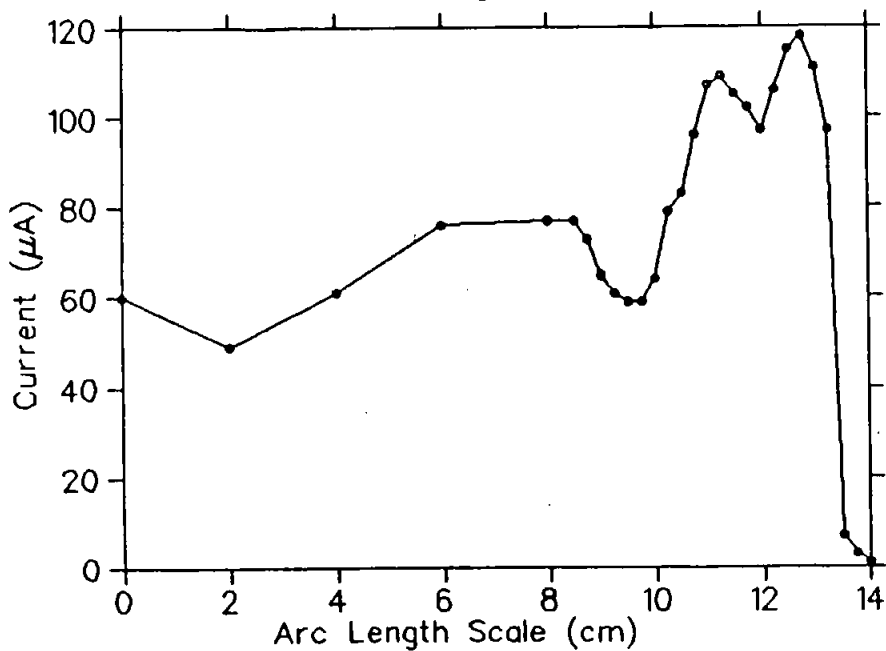
180 Degrees



225 Degrees



270 Degrees



315 Degrees

