

## Corrections to IN6 detector angles

L.K.H. Andersen, June 1991

The spectra concerned are #53 and 85-89 as given in table II of (1). The angles given here are the design values for the detectors in the horizontal plane.

Up to and including #65, these are in boxes of four with each detector wired separately, as shown in fig. 1. The only exception to the pattern shown here is the value given for the angle of #53, which is  $0.1^\circ$  from its expected position, as seen in fig. 2. This corresponds to a displacement of 4mm. Looking at the box containing #53 and comparing it with the neighbouring box shows that the detector positions are identical to within 2mm.

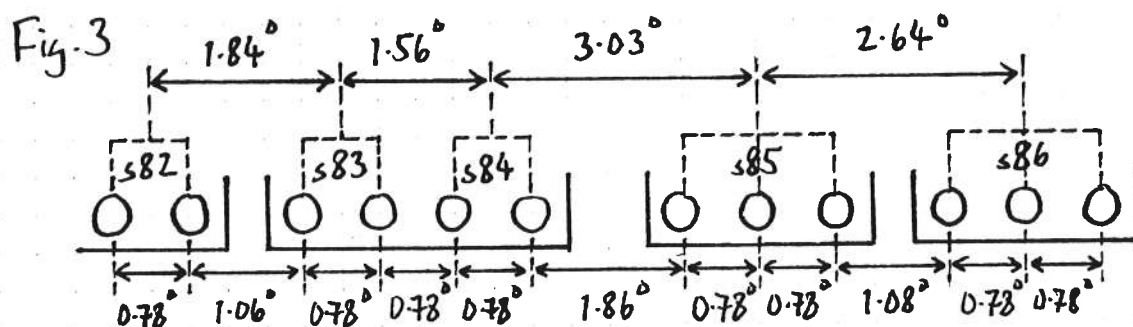
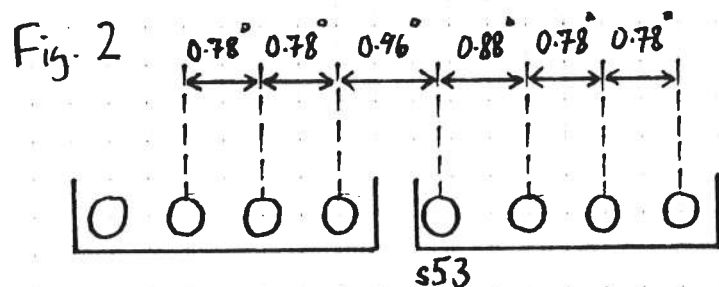
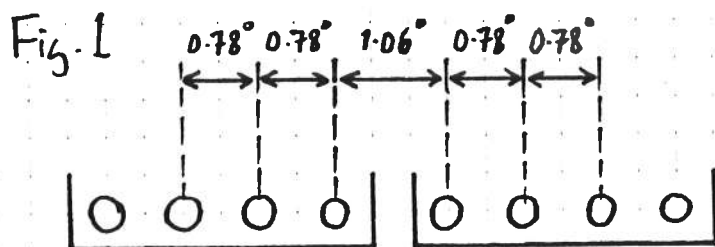
Between #84 and #85 there is a change in the wiring of the detectors. Below this, they are in boxes of four, wired in twos, and above they are in boxes of three, all wired together, as shown in fig. 3. If we assume that the spacing between the detectors is still  $0.78^\circ$  as in figs 1 and 2, regardless of the box size or wiring, we obtain a distance between the closest detectors of #84 and #85 of  $1.86^\circ$  as compared with a distance of  $1.06^\circ$  between the boxes containing four detectors and  $1.08^\circ$  between the boxes of three. This means that the separation between the boxes containing #84 and #85 is 3cm greater than the separation between any of the other boxes in the horizontal plane, which should be easy to see. We checked on IN6 and if this separation is greater than that of the other boxes, the difference is of the order of millimetres. Setting the distance between the closest detectors of #84 and #85 to  $1.08^\circ$ , as it is between the boxes of three detectors, we obtain a value of  $3.03^\circ$  as the distance between the axes of the two detector boxes. This may be where this number comes from.

Table I shows the detector angles obtained by setting the separation to  $1.08^\circ$ , and correcting the angle of #53.

Fig. 4 shows the results from an IN6 experiment on superfluid  $^4\text{He}$  in November 1989. As can be seen, changing the values of the scattering angles of #85-89 as described has a significant effect, and improves the agreement with the tabulated phonon energies from (2).

## References

- (1) Le spectrometre à temps de vol IN6 - ILL Report 83BL21G  
Y. Blanc
- (2) Donnelly et al., Journal of Low Temperature Physics, Vol 44, p.471 (1981)



TITLE :  $^4\text{He}$  phonon-roton dispersion curve

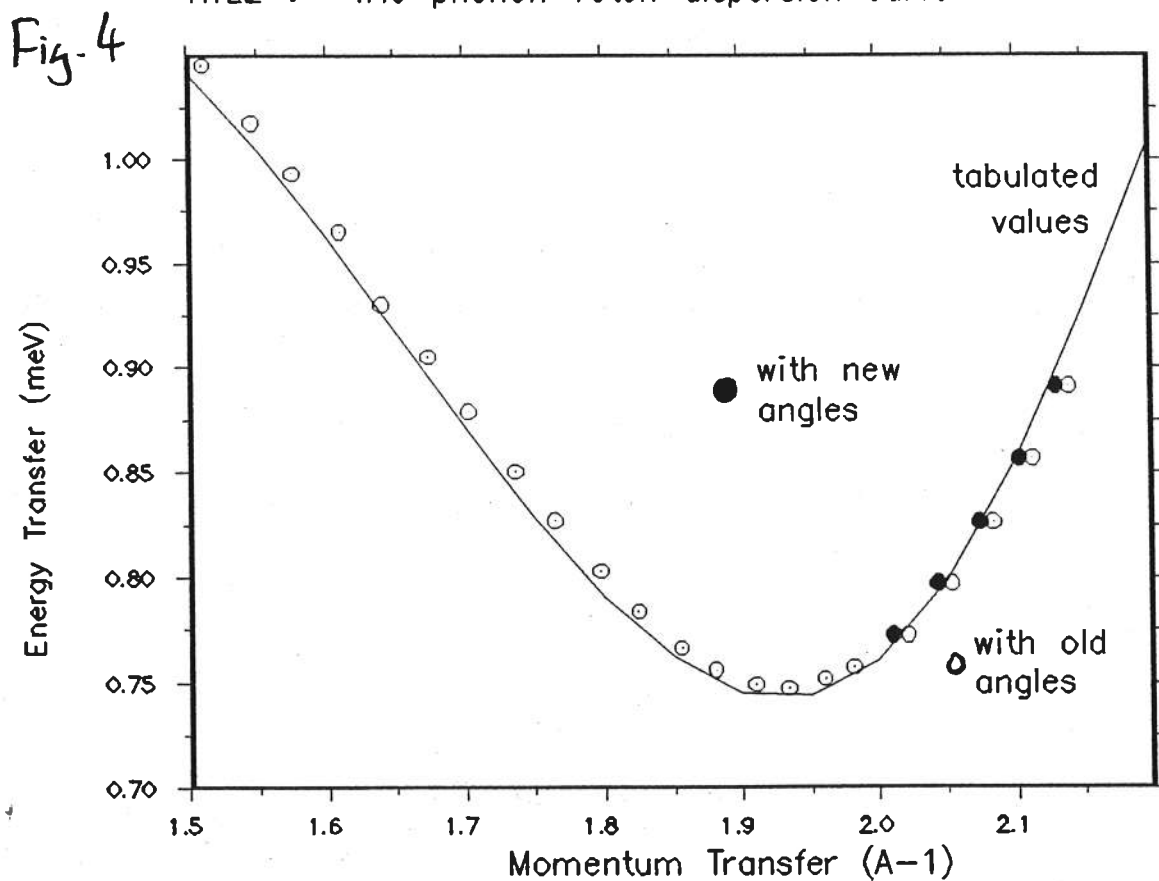


Table I

No	Angle	No	Angle	No	Angle	No	Angle	No	Angle
1	10.33	19	25.49	37	40.93	55	56.09	73	82.12
2	11.11	20	26.27	38	41.71	56	56.87	74	83.68
3	11.89	21	27.33	39	42.49	57	57.93	75	85.52
4	12.67	22	28.11	40	43.27	58	58.71	76	87.08
5	13.73	23	28.89	41	44.33	59	59.49	77	88.92
6	14.51	24	29.67	42	45.11	60	60.27	78	90.48
7	15.29	25	30.73	43	45.89	61	61.72	79	92.32
8	16.07	26	31.51	44	46.67	62	63.28	80	93.88
9	17.13	27	32.29	45	47.73	63	65.12	81	95.72
10	17.91	28	33.07	46	48.51	64	66.68	82	97.28
11	18.69	29	34.13	47	49.29	65	68.52	83	99.12
12	19.47	30	34.91	48	50.07	66	70.08	84	100.68
13	20.53	31	35.69	49	51.13	67	71.92	85	102.93
14	21.31	32	36.47	50	51.91	68	73.48	86	105.57
15	22.09	33	37.53	51	52.69	69	75.32	87	108.21
16	22.87	34	38.31	52	53.47	70	76.88	88	110.85
17	23.93	35	39.09	53	54.53	71	78.72	89	113.49
18	24.71	36	39.87	54	55.31	72	80.28		