Hupmobile Cloud Chamber Parameters

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A. F. Clark

September 28, 1967

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MEMORANDUM--28 September 1967

TO: Distribution

FROM: N. E. Hansen and A. F. Clark

SUBJECT: Hupmobile Cloud Chamber Parameters

The accompanying table lists the presently selected parameters for the twelve cloud chambers.

The chambers are numbered consecutively from 1 through 12. They are to be lined up in the bunker. The number of the lowest chamber is closest to the source.

All except the first chamber have some thin metal filters to attenuate the flux and harden the spectrum. Cloud Chambers 10, 12, and 14 are shielded by a collimator with about 200 pinholes in it. The flux in these chambers is attenuated by the ratio of the pinhole area to total beam area which is a factor of 50.

Various gases and gas pressures are used to obtain suitable track lengths and interaction cross sections. Neon, argon and krypton are used to obtain photo electrons. Hydrogen is used to obtain Compton electrons.

"K peak" is the energy of the original x-rays which is expected to produce the most electron tracks. The shape of the electron distribution depends on both the incident photon spectrum and the variation with energy of the photo electric or Compton cross sections in the chamber.

The original x-ray energies corresponding to the "full width at half maximum" limits of the electron track distribution are listed as "k band width".

β peak is the electron energy of the peak of the distribution, i.e., the most probable electron energy. In the Compton Chambers β peak is the energy of the most energetic Compton electron corresponding to the peak of the incident x-ray distribution.
## Table: Single Scattered Beam – Double-Scattered Beam

<table>
<thead>
<tr>
<th>Chamber Number</th>
<th>Working Gas</th>
<th>Working Pressure (Atmospheres)</th>
<th>L.O.S. Filters</th>
<th>k Peak (KeV)</th>
<th>k Bandwidth (FWHM, KeV)</th>
<th>B Peak (KeV)</th>
<th>Electron Track Length (Mode; cm)</th>
<th>Number of Tracks</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Neon</td>
<td>1/4</td>
<td>None</td>
<td>9</td>
<td>7-14</td>
<td>8</td>
<td>1.0</td>
<td>300</td>
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<tr>
<td>5</td>
<td>Neon</td>
<td>1/4</td>
<td>0&quot;.010 Al</td>
<td>17</td>
<td>11-25</td>
<td>15</td>
<td>2.9</td>
<td>100</td>
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<tr>
<td>6</td>
<td>Neon</td>
<td>1</td>
<td>0&quot;.040 Al</td>
<td>22</td>
<td>17-30</td>
<td>19</td>
<td>1.1</td>
<td>300</td>
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<td>7</td>
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<td>0&quot;.005 Cu</td>
<td>30</td>
<td>23-45</td>
<td>24</td>
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<td>29-53</td>
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<td>200</td>
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<td>49-95</td>
<td>39</td>
<td>1.3</td>
<td>250</td>
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<td>34-68</td>
<td>5.7</td>
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<td></td>
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<tr>
<td>11</td>
<td>Hydrogen</td>
<td>1/4</td>
<td>0&quot;.010 Cu</td>
<td>58</td>
<td>42-84</td>
<td>9.5</td>
<td>4.4</td>
<td>100</td>
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<tr>
<td>(PINHOLES)</td>
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<td></td>
<td>0&quot;.005 Mo</td>
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<tr>
<td>12</td>
<td>Hydrogen</td>
<td>1</td>
<td>0&quot;.010 Mo</td>
<td>58</td>
<td>42-84</td>
<td>9.5</td>
<td>1.1</td>
<td>300</td>
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<tr>
<td>(PINHOLES)</td>
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<td></td>
<td>0&quot;.005 Mo</td>
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<td>13</td>
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<td>67</td>
<td>49-94</td>
<td>13</td>
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<td>100</td>
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<td></td>
<td>0&quot;.010 Mo</td>
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<tr>
<td>14</td>
<td>Krypton</td>
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<td>75-111</td>
<td>65</td>
<td>3.1</td>
<td>150</td>
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<tr>
<td>(PINHOLES)</td>
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<td>0&quot;.060 Mo</td>
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<tr>
<td>15</td>
<td>Hydrogen</td>
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<td>65-106</td>
<td>16</td>
<td>2.8</td>
<td>150</td>
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<tr>
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<td>0&quot;.030 Mo</td>
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</table>
β peak track length is the calculated length for the most probable electron energy.

If the tracks are long we will further limit the expected number of tracks to prevent ambiguous over-lap of tracks.

AC: jb

Distribution:

1 of 26 A A. R. Biehl
2 of 26 A J. E. Carothers/J. N. Shearer
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4 of 26 A M. E. Cunningham
5 of 26 A L. S. Germain
6 of 26 A W. H. Grasberger
7 of 26 A N. E. Hansen
8 of 26 A W. John
9 of 26 A M. Johnson
10 of 26 A B. C. Hudson
11 of 26 A M. W. Knapp
12 of 26 A J. H. Mallett
13 of 26 A W. H. McMaster
14 of 26 A P. H. Moulthrop
15 of 26 A H. L. Reynolds
16 of 26 A L. M. Richards
17 of 26 A H. A. Ryder
18 of 26 A F. D. Seward
19 of 26 A D. E. Smith
20 of 26 A W. Wakeman
21 of 26 A J. C. Watson
22 of 26 A E. C. Woodward
23 of 26 A B. West, EGG-SR
24 of 26 A R. F. Herbst
25 of 26 A M. M. May
26 of 26 A File