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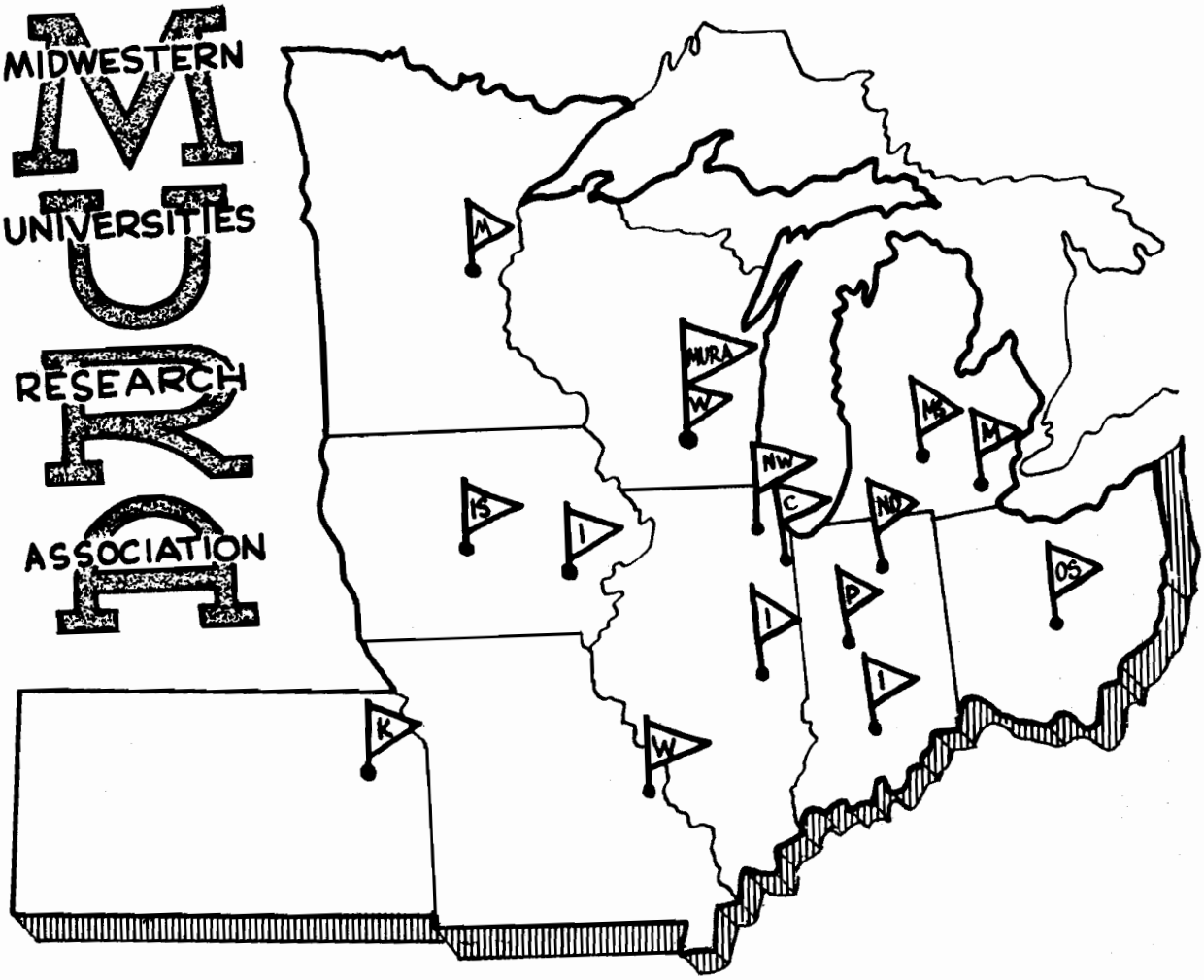

REPORT

COSPLASH
(Program 308)
October 1, 1960

NUMBER 588

Computer Program

D. Dickman

I. GENERAL DESCRIPTION

Based on a request and writeup from A. Galonsky and W. Smith; Program 308 evolved from 2 previous codes (303 and 306).

The object of the program is one of transformation and rearranging. Given various values of energy, momenta, and angles in the laboratory system (LS) and the experimental data of the number of particles per collision in the center of mass system (CMS) by a table; COSPLASH computes 2 values: $N(P_o,\Theta)$ and $F(E_o,\Theta)$. These values are the energy and momentum distribution in the LS. Intermediate steps involve computing CMS for finding the proper value of F^* (number of particles per collision in the CMS). These 2 values are arranged in 2 ways in the output: (a) for all angles at a given value of P_o and E_o, and (b) for all P_o and E_o at a given angle. Additional results computed are: (a) integration of $F(E_o,\Theta)$ and $N(P_o,\Theta)$ over all angles, (b) integration over energy for any given angle, and (c) 2 check values, M_2 and M_3, which should agree fairly close.

II. OUTPUT

The output is in 2 phases. Phase 1 increments P_o and E_o. For each value of P_o and E_o; $N(P_o,\Theta)$ and $F(E_o,\Theta)$ are computed for all values of Θ between zero and the maximum value of Θ (a computed quantity). The values are also written on tape. Phase 2 reads these results from tape and rearranges them so that all values of E_o and P_o are printed for each increment in Θ).

At the beginning of the run, the input values and computed minimums and maximums for that run are printed.

III. INPUT

The input consists of 3 sets of numbers, all in floating point: run values, E Table, and F Table. (see attached agendum sheets).

In entering the data on the agendum sheets, the following rules must be observed:

1. The decimal point is assumed to be to the right of the left-most digit in the number.

2. All exponents other than zero must be entered. Unsigned exponents are assumed positive.

3. The last entry in the E Table and F Table must be a minus 1. Thus a maximum of 50 entries is possible.

4. Entries in the E Table must be in ascending order and non-zero (except for first values already entered).

5. If ΔE and ΔP are zero and not entered; the program, will set them to 0.2.

6. If $\Delta \Theta$ is zero; the program will set it to 3^{o}(in radians).

7. The particle has a range from 1 to 24 corresponding to the elementary particles (see attached sheet).

Violation of rules 1, 2, or 3 will lead to erroneous results and perhaps a stop. Violation of rule 4 will lead to a divide check and halt.

If the input data is such that the code has to take the square root of a negative number; the machine will halt. Pushing the start button sets the number positive and the run continues.

If the calculated value of $\overline{E}_0$ is greater than any entry in the E Table; the code sets F^* to zero and the run continues.

IV. OPERATING NOTES

The data is placed in back of the binary deck, several runs may be stacked as the code always returns to the input after completing a run. After the last run, whether it be one or more, have a "stop series" card and 2 blank cards after the "end float" card. The program will then "HALT" after completing the last run. The printer, card reader, and 2 tapes are needed for a run. The tapes are set to 3 and 4. The printer board is the MURA # 2 board.

PRIORITY:

NAME: _____

COSPLASH AGENDUM
(Program 308)

INSTRUCTIONS:

1. One entry per card.
2. Start in Column 1, column 5 blank.
3. Any address whose number field is blank may be omitted.
4. All data is floating point.

COLUMN 1 5

ID	ADDRESS		NUMBER	± EXP
M_o	2767			
ΔE	2776			
ΔP	2777			
ΔΘ	2775			
A	2770			
B	2771			
C	2772			
M_o	2766		9382000	-1
T	2769			
M	2768			
RUN NO.	2773			
PARTICLE	2774			
E TABLE	2791		0000000	+00
1	2792			
2	2793			
3	2794			
4	2795			
5	2796			
6	2797			
7	2798			
8	2799			
9	2800			
10	2801			
11	2802			
12	2803			
13	2804			
14	2805			
15	2806			
16	2807			
17	2808			
18	2809			
19	2810			
20	2811			
21	2812			
22	2813			
23	2814			
24	2815			
25	2816			
26	2817			
27	2818			

COLUMN 1 5

ID	ADDRESS		NUMBER	± EXP
28	2819			
29	2820			
30	2821			
31	2822			
32	2823			
33	2824			
34	2825			
35	2826			
36	2827			
37	2828			
38	2829			
39	2830			
40	2831			
41	2832			
42	2833			
43	2834			
44	2835			
45	2836			
46	2837			
47	2838			
48	2839			
49	2840			
50	2841			
LAST E	2842			
F TABLE	2843		0000000	+00
1	2844			
2	2845			
3	2846			
4	2847			
5	2848			
6	2849			
7	2850			
8	2851			
9	2852			
10	2853			
11	2854			
12	2855			
13	2856			
14	2857			
15	2858			

COLUMN 1	5				COLUMN 1	5			
ID	ADDRESS		NUMBER	± EXP	ID	ADDRESS		NUMBER	± EXP
16	2859				35	2878			
17	2860				36	2879			
18	2861				37	2880			
19	2862				38	2881			
20	2863				39	2882			
21	2864				40	2883			
22	2865				41	2884			
23	2866				42	2885			
24	2867				43	2886			
25	2868				44	2887			
26	2869				45	2888			
27	2870				46	2889			
28	2871				47	2890			
29	2872				48	2891			
30	2873				49	2892			
31	2874				50	2893			
32	2875				LAST F	2894			
33	2876								
34	2877							END FLOAT	

Names of elementary particles

1	Photon
2	Pion +
3	Pion -
4	Pion 0
5	K+
6	K-
7	K^0
8	anti-K^0
9	Proton
10	Antiproton
11	Neutron
12	Antineutron
13	Sigma +
14	Antisigma +
15	Sigma -
16	Antisigma -
17	Sigma 0
18	Antisigma 0
19	Xi -
20	Anti-Xi -
21	Xi 0
22	Anti-Xi 0
23	Lambda
24	Anti-Lambda