The Discovery of the W boson

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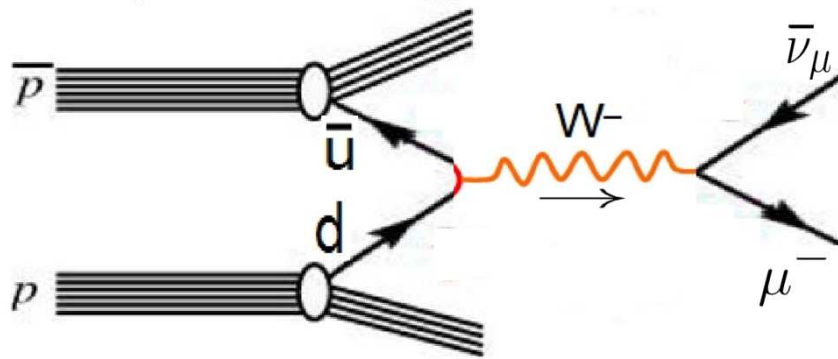
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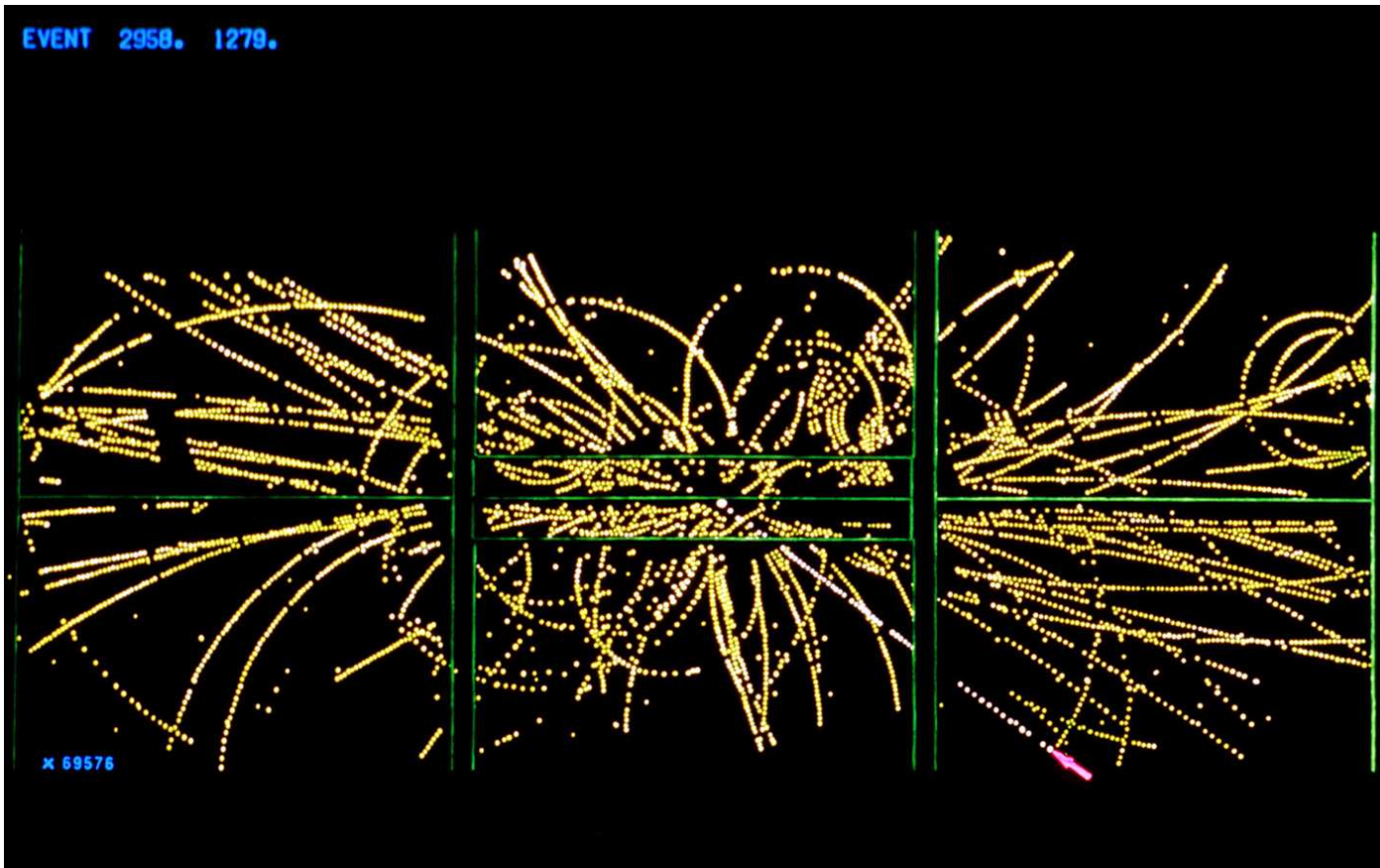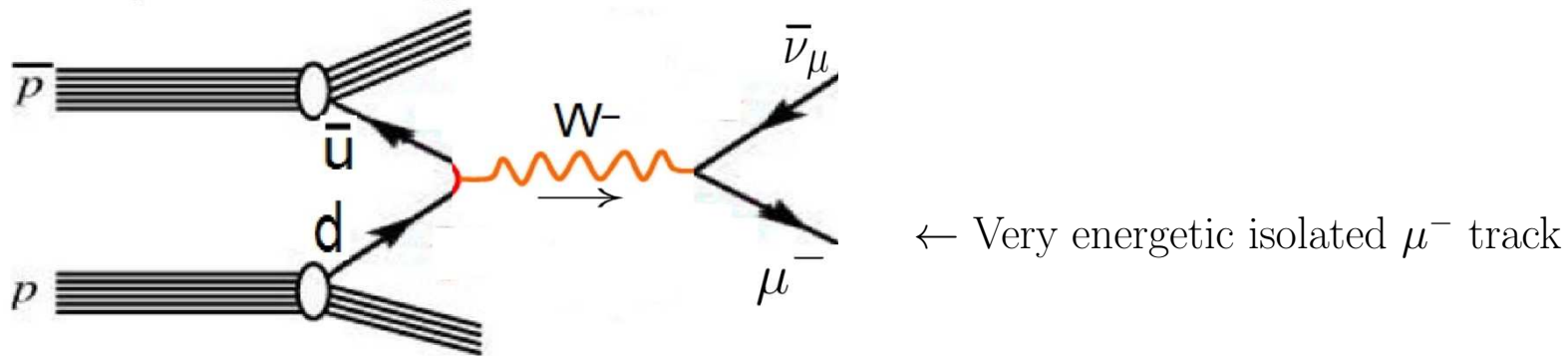In 1983 at CERN in the SPS $p\bar{p}$ collider it was observed the process

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The basic diagram for this process is

$\leftarrow$ Very energetic isolated μ^- track

The real event display

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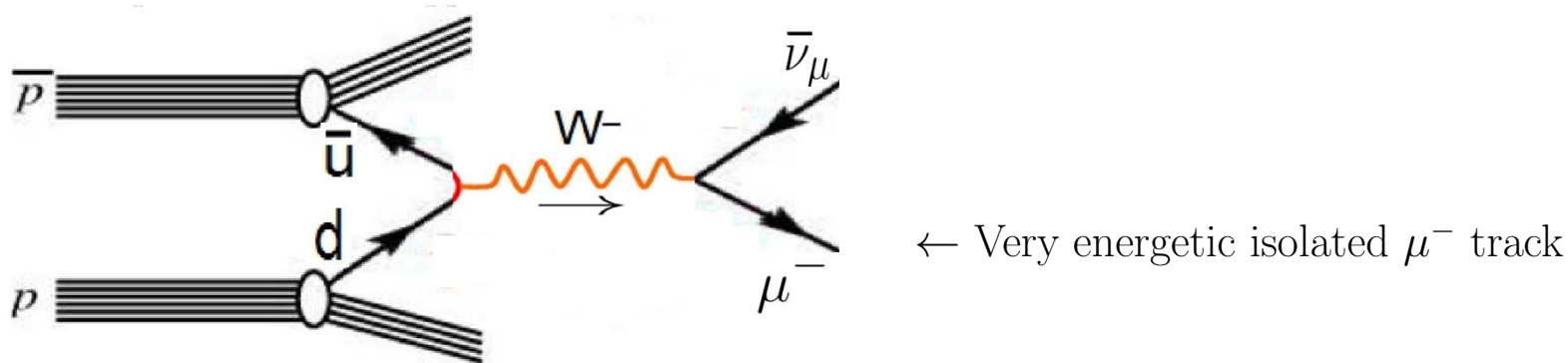$$M_W \sim 80 \text{ GeV} \qquad \text{we now have precisely measured } M_W = 80.379 \pm 0.012 \text{ GeV}$$

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From this and the value of G_F we get the value of g_w

$$g_w^2 = \frac{G_F\, 8\, M_W^2}{\sqrt{2}} \simeq 0.42 \Rightarrow \qquad \frac{e^2}{g_w^2} \simeq 0.22$$