

## OBSERVATIONS OF NEUTRONS IN ASSOCIATION WITH THE LARGE SOLAR FLARE OF 6 NOVEMBER 1997

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The largest solar flare (X9.4) of the present cycle was observed at 1149 UT on 6 November 1997. It occurred at S18W63 on the solar surface. We have carefully investigated the enhanced neutron flux associated with this flare and have found that an enhancement occurred as expected at 1149 UT. Surprisingly, there was also a second enhancement which occurred earlier at 1141 UT in association with a rather small (C4.7) X-ray flare. The statistical significance of the excess fluxes were  $3\sigma$  at 1149 UT and  $7.6\sigma$  at 1141 UT, respectively. We have performed a simulation study to try to account for this unexpected result and found a possible solution: if neutron production occurred relatively deeply ( $z \sim -300$  km) in the photosphere it would be possible for neutrons to escape whereas gamma-rays would be strongly absorbed. We believe that this is the first case in which neutrons have been detected but X-rays and other photons are largely absent as a result of atmospheric absorption.