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Mr. Alfred GUNTHER/DOC



PROPOSAL

SEARCH FOR HEAVY, PENETRATING AND LONG-LIVED PARTICLES
IN THE NA3 SPECTROMETER

CERN¹, Collège de France², Orsay (LAL)³,
Palaiseau (Ecole Polytechnique)⁴, Pisa⁵, Saclay⁶.

J. Badier⁴, C. Bemporad⁵, J. Boucrot³, J. Bourotte⁴, O. Callot³,
Ph. Charpentier⁶, A.M. Cnops⁵, M. Crozon², P. Delpierre²,
J.F. Detoef⁶, P. Espigat², G.R. Giannini⁵, M. Hansroul¹,
P. Lariccia⁵, A. Michelini¹, A. Tilquin², J.K. Walker³

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SUMMARY

We propose to perform a sensitive search of heavy, penetrating and long-lived particles using the NA3 spectrometer in its beam-dump configuration. The experiment is sensitive to masses up to $\sim 6 \text{ GeV}/c^2$ and to lifetimes from 10^{-10} s up to several 10^{-8} s. It will use 300 GeV/c incoming pions with an intensity around 10^7 /burst. The decay product of the new particles would be detected in the large acceptance NA3 spectrometer, using all the capabilities of the existing detectors with only small modifications. A modest running time (about 10 effective days) can give limits as low as $B\sigma \sim 0.2$ picobarns for the production of weakly interacting particles such as Higgs bosons, axions or technipions. For strongly interacting new particles like gluinos or R-hadrons, limits will be given in a kinematical domain where present constraints are quite loose. The experiment could be performed during Summer 1984, after some days for testing trigger rates and operating conditions.

