Search for a Doubly-Charged Higgs Boson in Muon Channel at DØ

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Doubly-charged Higgs Boson appears in several models:
- Left-right symmetric models, Little-Higgs model, MSSM.

Higgs field is represented by a triplet representation together with neutral and singly-charged Higgs.
L-handed and R-handed Higgs fields are possible

Higgs triplets are only one of the Higgs multiplets that break the symmetry between L- and R-handed weak interactions at low energy.

All models suggest low mass and relatively large cross section for a doubly-charged Higgs boson.
This is the first search for a doubly-charged Higgs bosons at hadron colliders (in muon channel only)

It significantly extends the previous mass limit:
OPAL collaboration:  \( M(H^{++}_L) > 100.5 \text{ GeV/c}^2 \),
\( M(H^{++}_R) > 100.1 \text{ GeV/c}^2 \)

Mass limit of 118.4 GeV/c² is obtained for L-handed and 98.2 GeV/c² for R-handed \( H^{++} \) boson, for BR=100% into muons and Yukawa couplings > 10⁻⁷.