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Exclusive scalar \mbox{\boldmath $f_0(1500)$} meson production

We evaluate differential distributions for exclusive scalar
$f_0(1500)$ meson (glueball candidate) production for
$p\bar{p} \to N_1 N_2 f_0$ and $pp \to pp f_0$.
%Several mechanisms were considered, including gluonic diffractive,
Both gluon induced diffractive, pion-pion meson exchange current (MEC) components as well as
double-diffractive mechanism with intermediate pionic loop
are calculated for the first time in the literature.
The pion-pion component, which can be reliably calculated,
dominates close to the threshold
while the gluonic diffractive or double-diffractive with pionic triangle components
may take over only for larger energies.
At the moment only upper limit for the gluonic diffractive component
can be obtained.
The gluonic diffractive component is calculated based on
two-gluon impact factors as well as in the framework
of Khoze-Martin-Ryskin approach proposed for diffractive
Higgs boson production.
Different unintegrated gluon distribution functions (UGDFs) from
the literature are used.
Rather large cross sections due to pion-pion fusion are predicted
for PANDA energies, where the gluonic mechanism is shown
to be negligible.
The production of $f_0(1500)$ close to threshold
could limit the so-called πNN form factor in the region of
larger pion virtualities.
We discuss in detail the two-pion background to the production
of the $f_0(1500)$ meson.
We include both two-pion rescattering background
(ρ-reggeon exchange)
and double-diffractive two-pion background
(both pomeron and reggeon exchanges).
The amplitudes are calculated in the Regge approach.
Our calculation shows that imposing extra cuts
should allow to extract the signal of the glueball $f_0(1500)$
candidate at the highest PANDA energy.
We compare our results with the existing data of
the WA102 Collaboration.

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