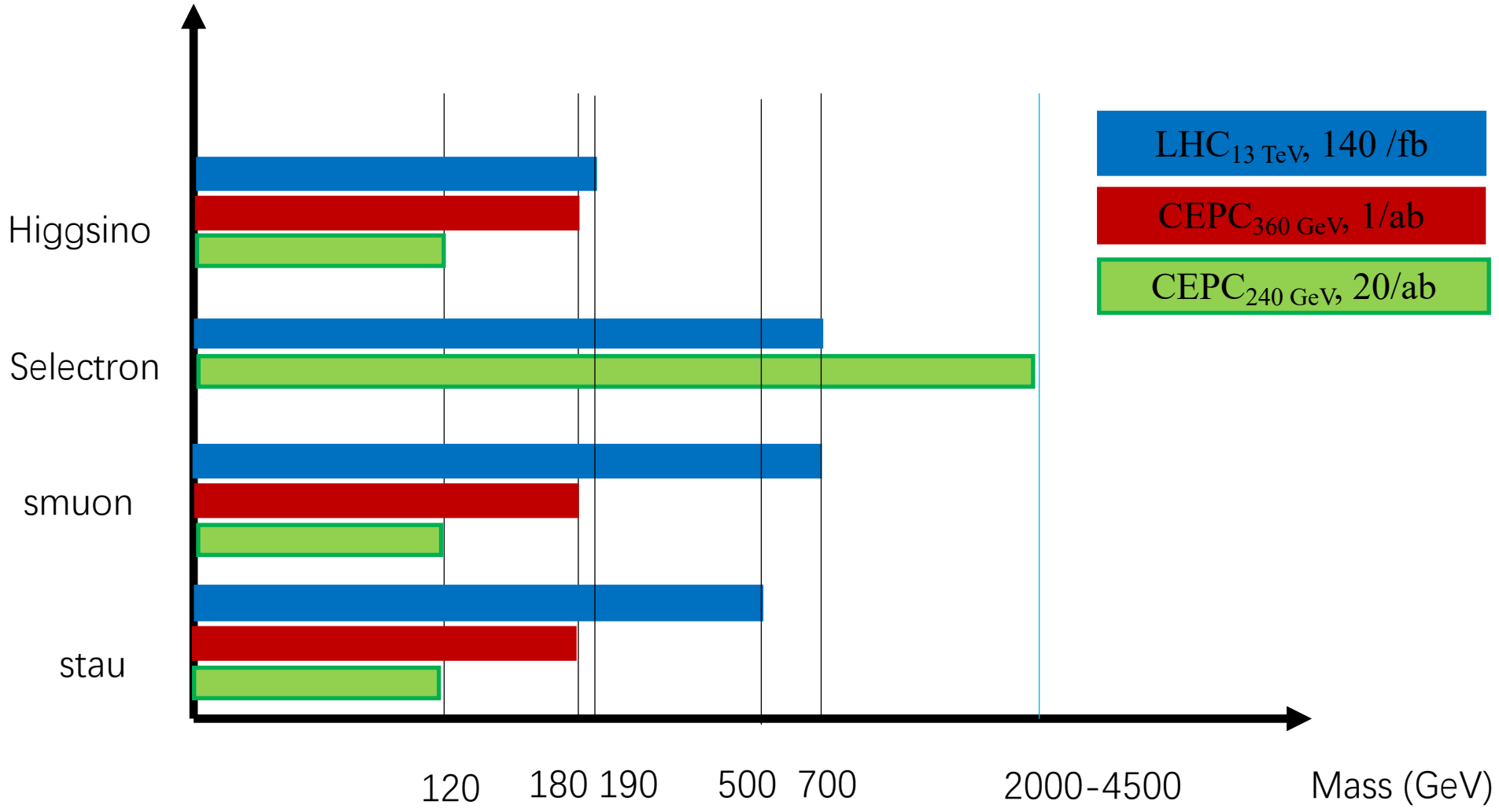
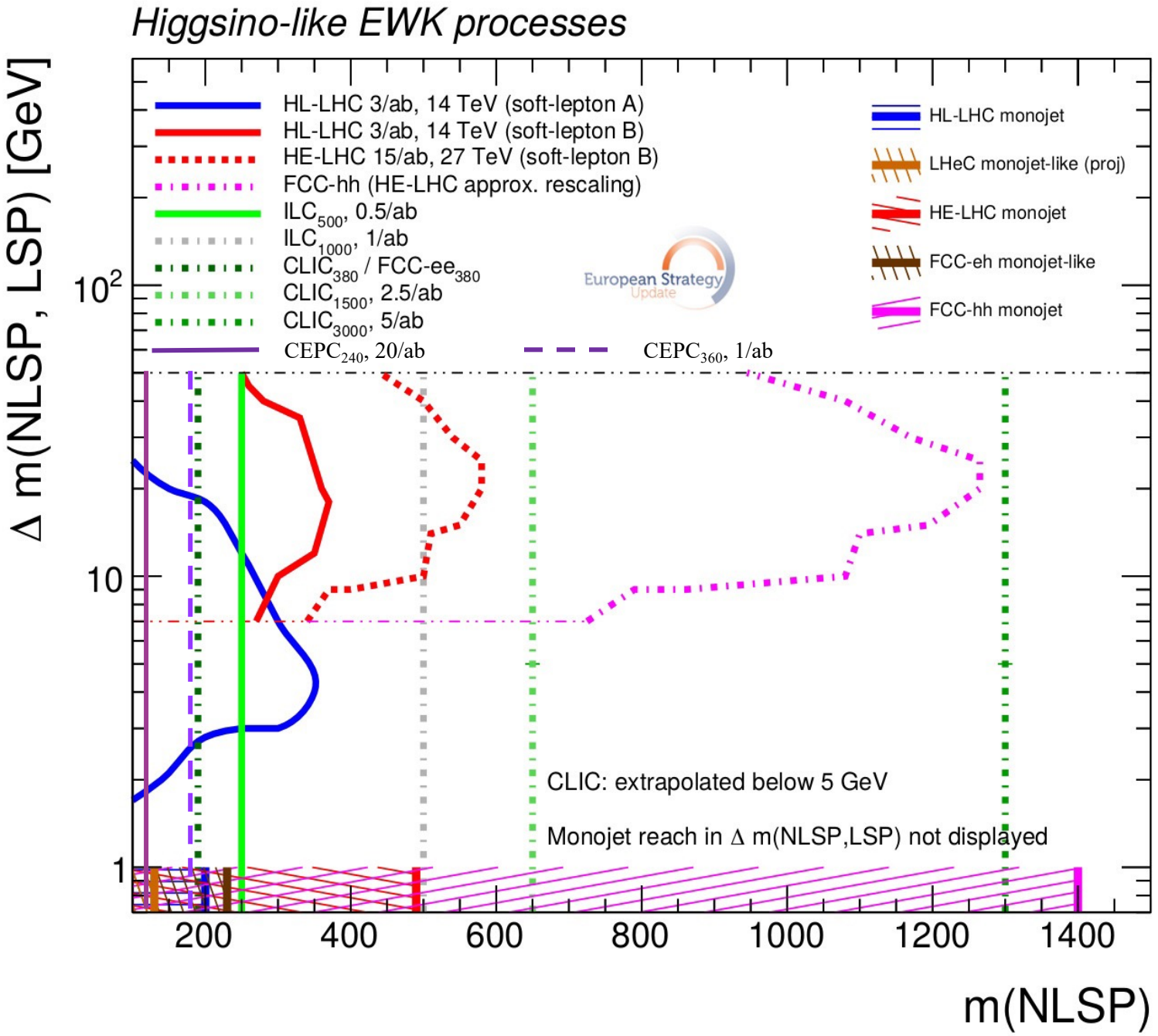
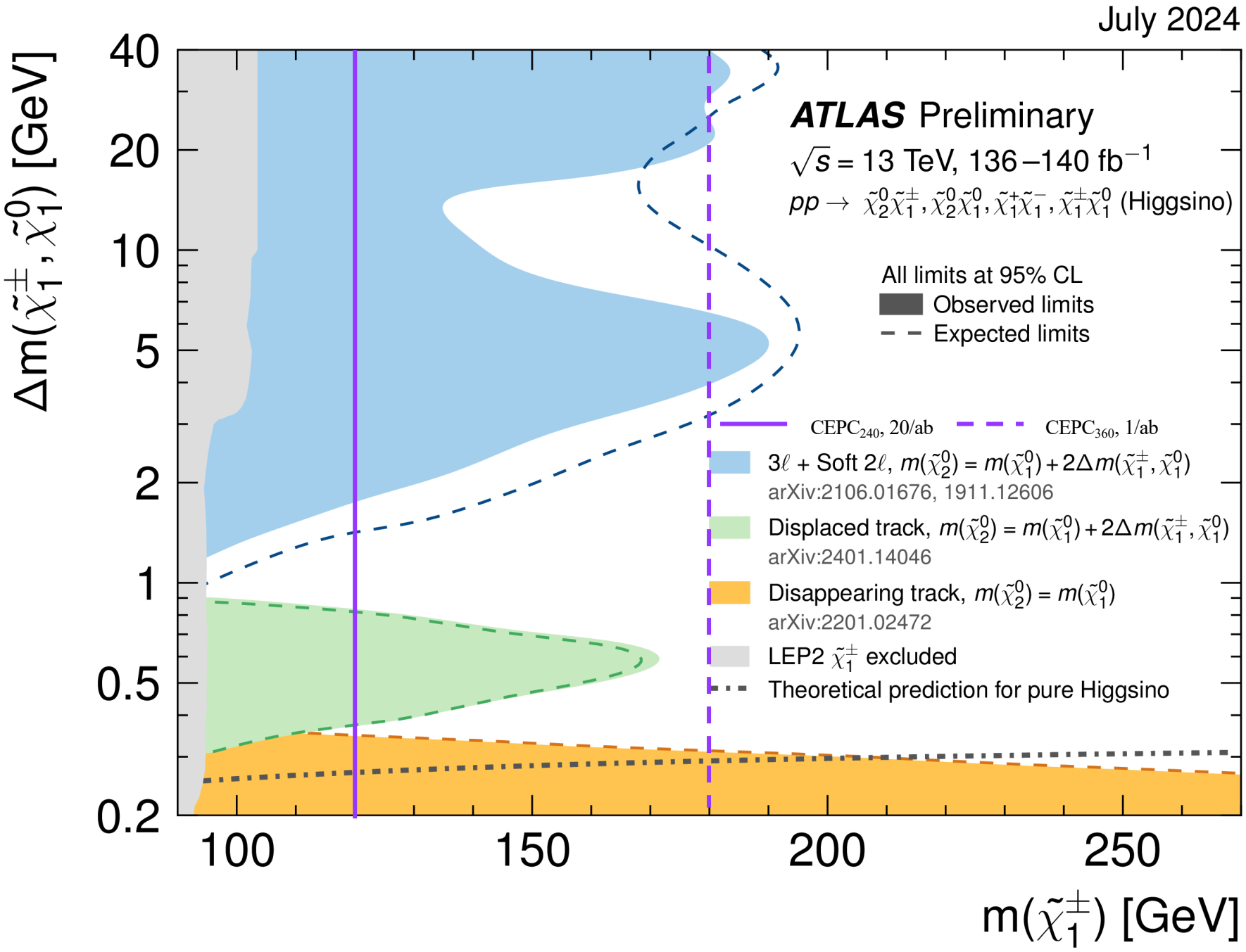
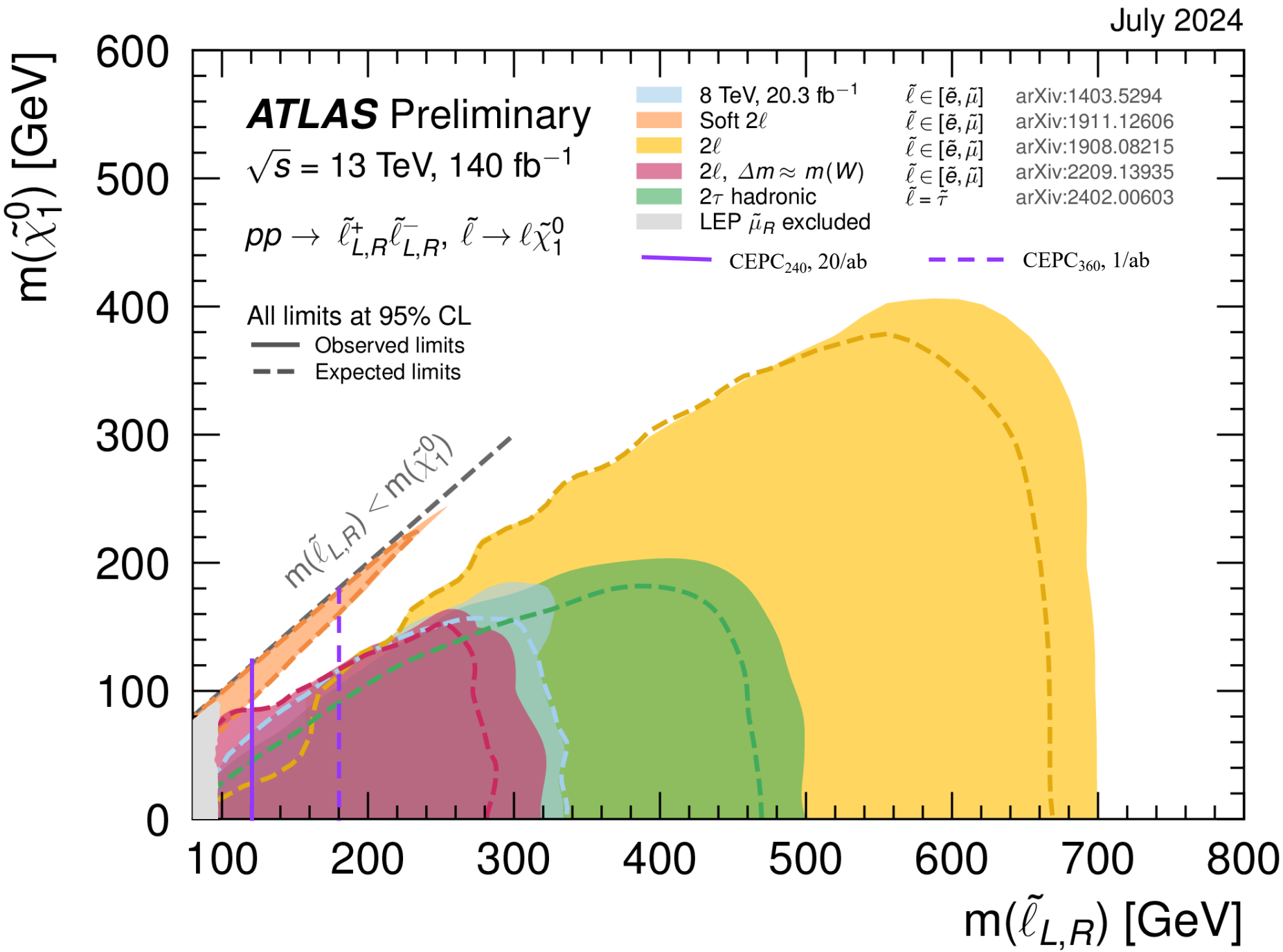


X-axis using log scale, to be improved.


Higgsino-like EWK processes
Δ m(NLSP, LSP) [GeV]
m(NLSP)
HL-LHC 3/ab, 14 TeV (soft-lepton A)
HL-LHC 3/ab, 14 TeV (soft-lepton B)
HE-LHC 15/ab, 27 TeV (soft-lepton B)
FCC-hh (HE-LHC approx. rescaling)
ILC500, 0.5/ab
ILC1000, 1/ab
CLIC380 / FCC-ee380
CLIC1500, 2.5/ab
CLIC3000, 5/ab
CEPC240, 20/ab
CEPC360, 1/ab
HL-LHC monojet
LHeC monojet-like (proj)
HE-LHC monojet
FCC-eh monojet-like
FCC-hh monojet
European Strategy Update
CLIC: extrapolated below 5 GeV
Monojet reach in Δ m(NLSP,LSP) not displayed
10²
10
1
200
400
600
800
1000
1200
1400


July 2024
ATLAS Preliminary
√s = 13 TeV, 136–140 fb⁻¹
pp → χ̃₂⁰χ̃₁±, χ̃₂⁰χ̃₁⁰, χ̃₁⁺χ̃₁⁻, χ̃₁±χ̃₁⁰ (Higgsino)
All limits at 95% CL
Observed limits
Expected limits
CEPC240, 20/ab
CEPC360, 1/ab
3ℓ + Soft 2ℓ, m(χ̃₂⁰) = m(χ̃₁⁰) + 2Δm(χ̃₁±, χ̃₁⁰)
arXiv:2106.01676, 1911.12606
Displaced track, m(χ̃₂⁰) = m(χ̃₁⁰) + 2Δm(χ̃₁±, χ̃₁⁰)
arXiv:2401.14046
Disappearing track, m(χ̃₂⁰) = m(χ̃₁⁰)
arXiv:2201.02472
LEP2 χ̃₁± excluded
Theoretical prediction for pure Higgsino
Δm(χ̃₁±, χ̃₁⁰) [GeV]
m(χ̃₁±) [GeV]
40
20
10
5
2
1
0.5
0.2
100
150
200
250


July 2024
ATLAS Preliminary
$\sqrt{s}$ = 13 TeV, 140 fb^{-1}
$pp \to \tilde{\ell}^{+}_{L,R}\tilde{\ell}^{-}_{L,R}$, $\tilde{\ell} \to \ell\tilde{\chi}^{0}_{1}$
All limits at 95% CL
Observed limits
Expected limits
8 TeV, 20.3 fb^{-1}
Soft 2ℓ
2ℓ
2ℓ, $\Delta m \approx m(W)$
2τ hadronic
LEP $\tilde{\mu}_R$ excluded
$\tilde{\ell} \in [\tilde{e}, \tilde{\mu}]$ arXiv:1403.5294
$\tilde{\ell} \in [\tilde{e}, \tilde{\mu}]$ arXiv:1911.12606
$\tilde{\ell} \in [\tilde{e}, \tilde{\mu}]$ arXiv:1908.08215
$\tilde{\ell} \in [\tilde{e}, \tilde{\mu}]$ arXiv:2209.13935
$\tilde{\ell} = \tilde{\tau}$ arXiv:2402.00603
CEPC$_{240}$, 20/ab
CEPC$_{360}$, 1/ab
$m(\tilde{\ell}_{L,R}) < m(\tilde{\chi}^{0}_{1})$
$m(\tilde{\chi}^{0}_{1})$ [GeV]
$m(\tilde{\ell}_{L,R})$ [GeV]
0
100
200
300
400
500
600
700
800

Among all the searches discussed in this chapter, it is observed that the discovery potential is primarily constrained by the detector kinematics for s-channel SUSY production. However, when a supersymmetric particle can be produced via the t-channel or when an off-shell supersymmetric particle is produced via the s-channel, it is possible to break through the collision energy limits and probe heavier supersymmetric particles. Furthermore, for most of the studies presented below, the results are based on a center-of-mass energy of 240 GeV. A dedicated search for light smuons and staus extended this study to 360 GeV, reflecting an increase in sensitivity. A similar conclusion of enhanced sensitivity is expected for other searches when the center-of-mass energy reaches 360 GeV.