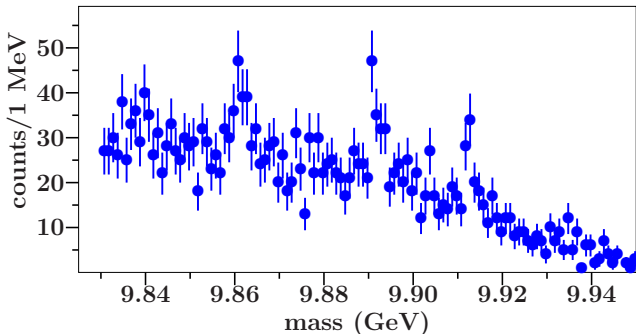# Mesonic Spectrum

$E(38)$

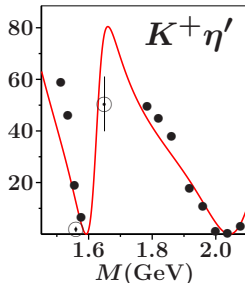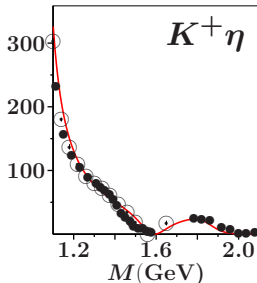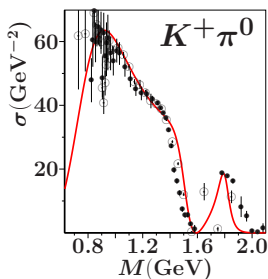# and $Z(57500)$

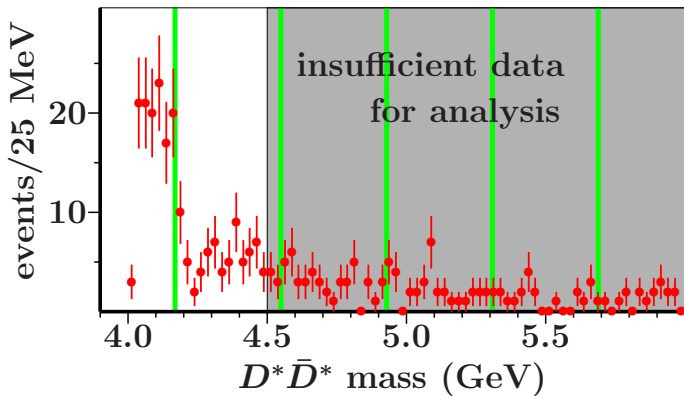# Modeling Mass Distributions from Scattering Experiments

Example: $b\bar{b} \to \Upsilon + \gamma$
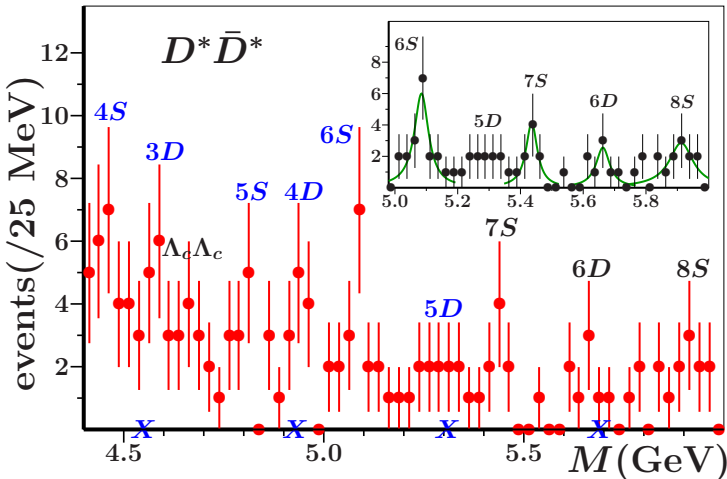
Results (1986–2003):

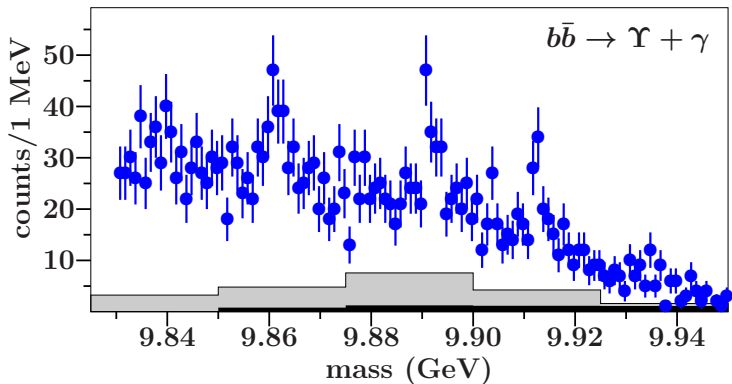

Rediscovery of kappa meson
$K_0^*(800)$

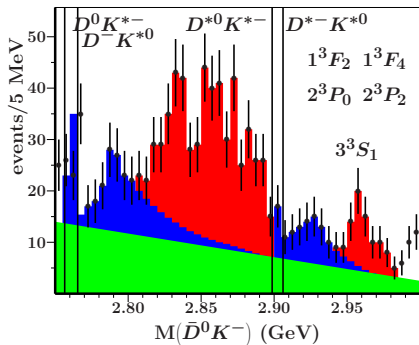# Four Decades of Observations:
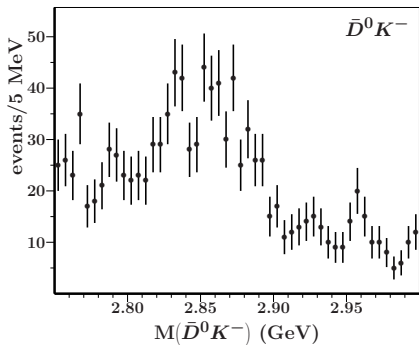
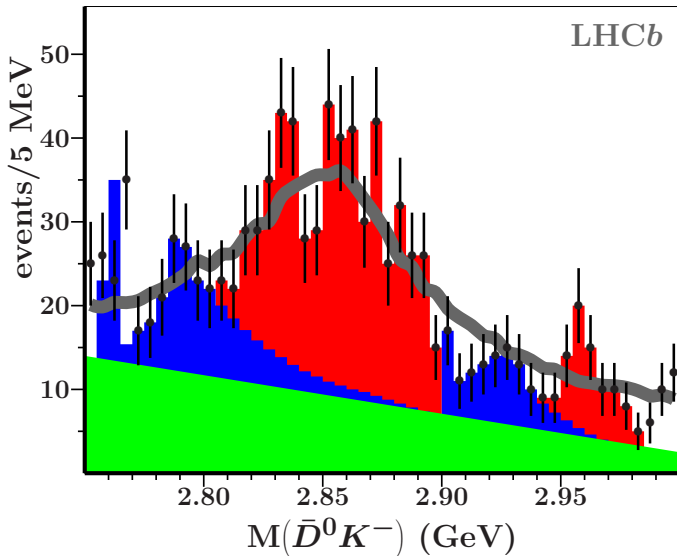# Comparison with Model (2010):

LHC (CERN)?

ARGUS (1985)

ATLAS (2012)

LHCb (CERN, 2014)?
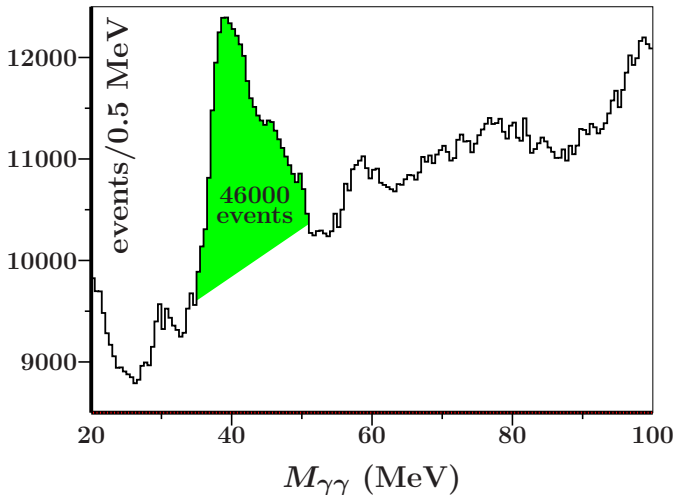

Measurement and what we expect

What LHCb expects:

Spin off:
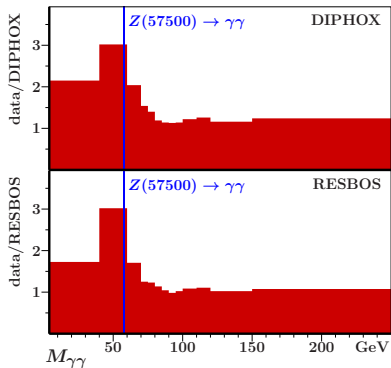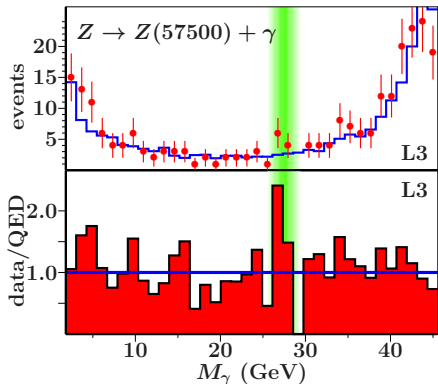
1. **E(38) boson (2010)**
2. **Z(57500) boson**

As a byproduct COMPASS produced E(38) in two-photon data:
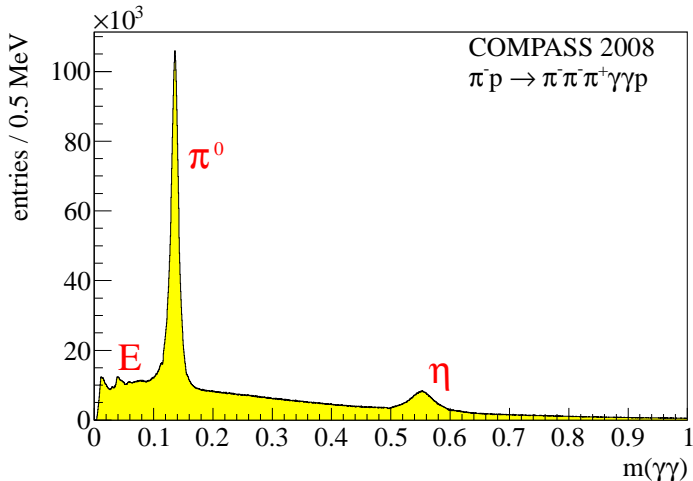
E(38) in detail (14σ):

Z(57500)

Existence Z(57500) implies:

1. **Standard Model $\neq$ Nature**
2. **Z(125 GeV) $\neq$ SM Higgs boson**

Alternative:

$$\text{QED} + \text{QCD (1984)}$$