# Theory Summary

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# Disclaimer

In this presentation I will present my take aways of this meeting

→ The presentation does not call for completeness

→ I focus on topics, not talks

→ The presentation is based on my subjective point of view

# Nature of Exotics

Talks and discussions revealed that the crucial quantities to understand the role of molecules in the spectrum are

→ the effective range (from lattice or experiment)

- ▷ $r > 0 \implies$ hadronic molecule
- ▷ $r < 0 \implies$ Compact component
  (or coupled channel effect?)

  Unitarity fixes prod. amp. E-dep. only up to polynomial!

→ lineshapes

What is needed:

→ Combined analysis of various channels
For $\chi_{c1}(3872)$: $\pi\pi J/\psi$, $D^0\bar{D}^{*\,0}$, $\pi\chi_{cJ}$

→ High resolution analyses (PANDA?)

# Amplitude Analyses

Breit Wigner analyses are to be taken with care:

$\rightarrow$ violate unitarity

$\rightarrow$ parameters reaction dependent

$\Longrightarrow$ parameters from one reaction to another questionable

$\Longrightarrow$ even too many states, e.g. only $\pi_1(1400)$; no $\pi_1(1600)$
(JPAC confirmed by Bochum group)

What is needed in formalisms consistent with

$\rightarrow$ unitarity

$\rightarrow$ analyticity

$\rightarrow$ chiral symmetry

$\rightarrow$ low energy phase shifts (non-trivial for s-waves)

$\rightarrow$ Role of triangle singul. (Discussion on Di-baryons)

Applies also to analysis of lattice data!

On a very good path to accomplish the program

Currently most pressing issue

$\Longrightarrow$ Lattice systematics needs to be understood

It is my understanding that there is not much freedom on phenomenological/dispersion theoretical side of the calculation