

# DecaySelector

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# The Problem

## Partial Wave Analysis

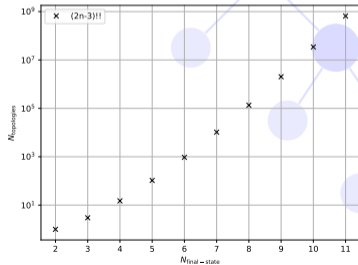
- ▶ Needed to disentangle Resonances in hadronic processes
- ▶ Angular description

## Frameworks

- ▶ Many different Frameworks
- ▶ All have different strengths
- ▶ Usage is very different

## Cascade Decay Model

- ▶ N-body decay modeled as consecutive 2-body decays
- ▶  $(2N - 3)!!$  topologies
- ▶ Keeping overview almost impossible for  $N > 3(4)$



# Proposed Solution

0 → 1,2,3,4

Add filter for specific nodes

0/psi(1S) K(S)0 pi+ pi-

0/psi(1S) K(S)0 pi+ pi-

Select decay tree

0 - 341 - 34 - 1  
2 1 4

Number of complete Chains: 2

Inspect chains for that tree

0 - 143 - 14 - 1  
2 1 4

Number of complete Chains: 0

0 - 134 - 13 - 1  
2 4 3

Number of complete Chains: 0

0 1 2 3 4

0+ 1- 2- 3- 4-

0/psi(1S) K(S)0 pi+ pi-

Select final/initial state Quantum Numbers

Add resonances by clicking on subsystem nodes

0

0/psi(1S) pi+ pi- pi- K(S)0 0/psi(1S) pi+ pi- pi+

Info messages and settings

Validate current state

Generate code for the amplitude and install helper

Load/Save from/to JSON

Nodes in current tree are highlighted

0/psi(1S) pi+ pi- 0 resonances

(3,4) pi+ pi- 1 resonances

(2,4) K(S)0 pi- 0 resonances

(2,3) K(S)0 pi+ 0 resonances

(1,3,4) 0/psi(1S) pi+ pi- 2 resonances

Add Resonance

psi(2S) 1 0 0 0

chi\_c1(3572) 1 0 0 0

(1,4) 0/psi(1S) pi- 0 resonances

(1,3) 0/psi(1S) pi+ 0 resonances

(1,2) 0/psi(1S) K(S)0 0 resonances

(1,2,4) 0/psi(1S) K(S)0 pi- 0 resonances

(1,2,3) 0/psi(1S) K(S)0 pi+ 0 resonances

Thank you for listening!

<https://kaihabermann.github.io/DecaySelector/>



Try out the Prototype!



Add your own parser!