

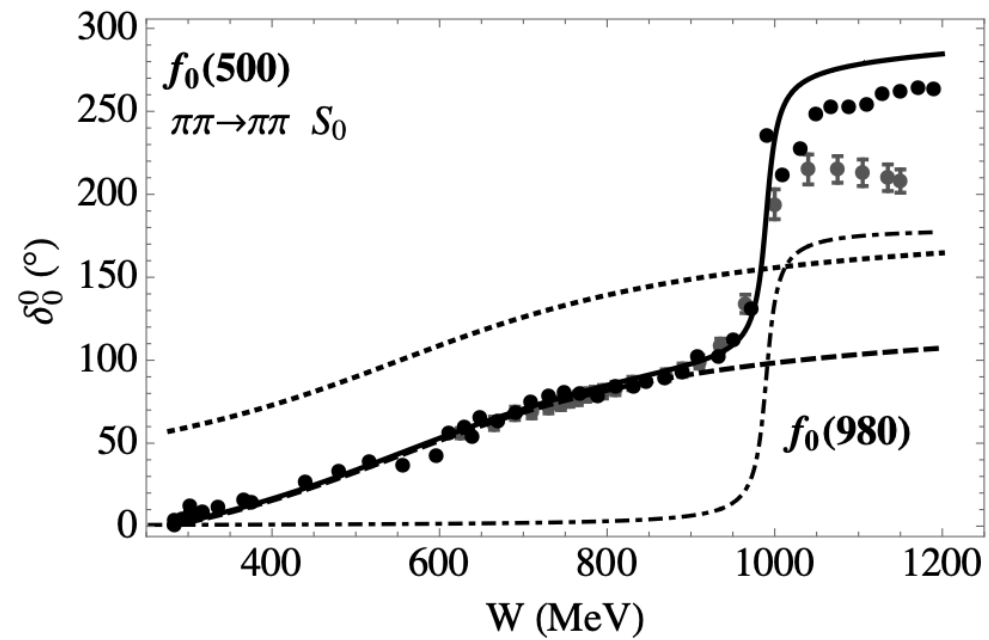
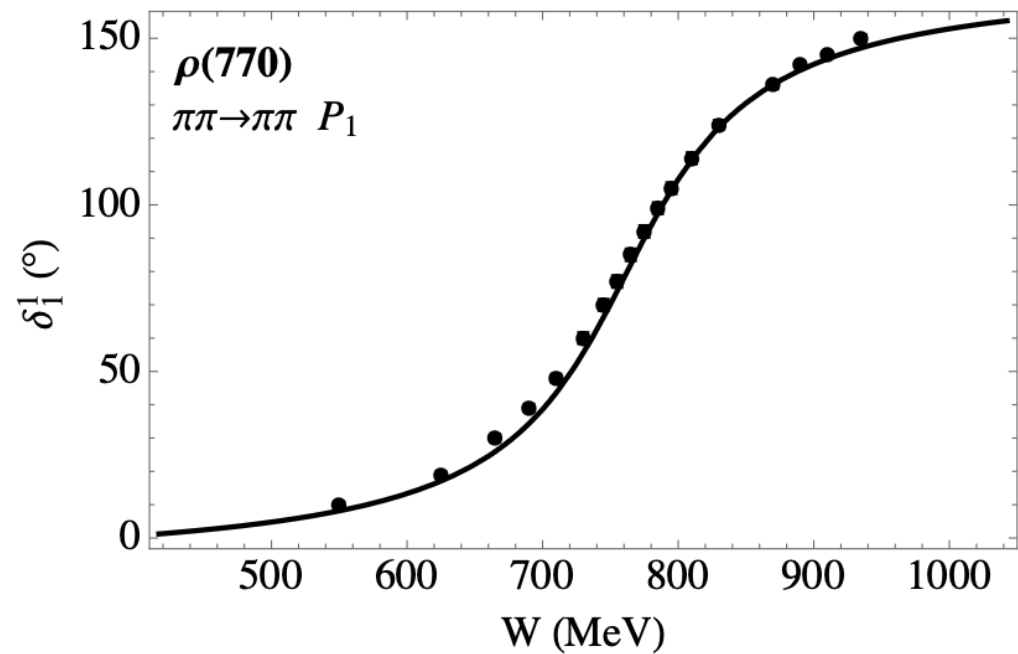
The strangest non-strange meson is not so strange after all

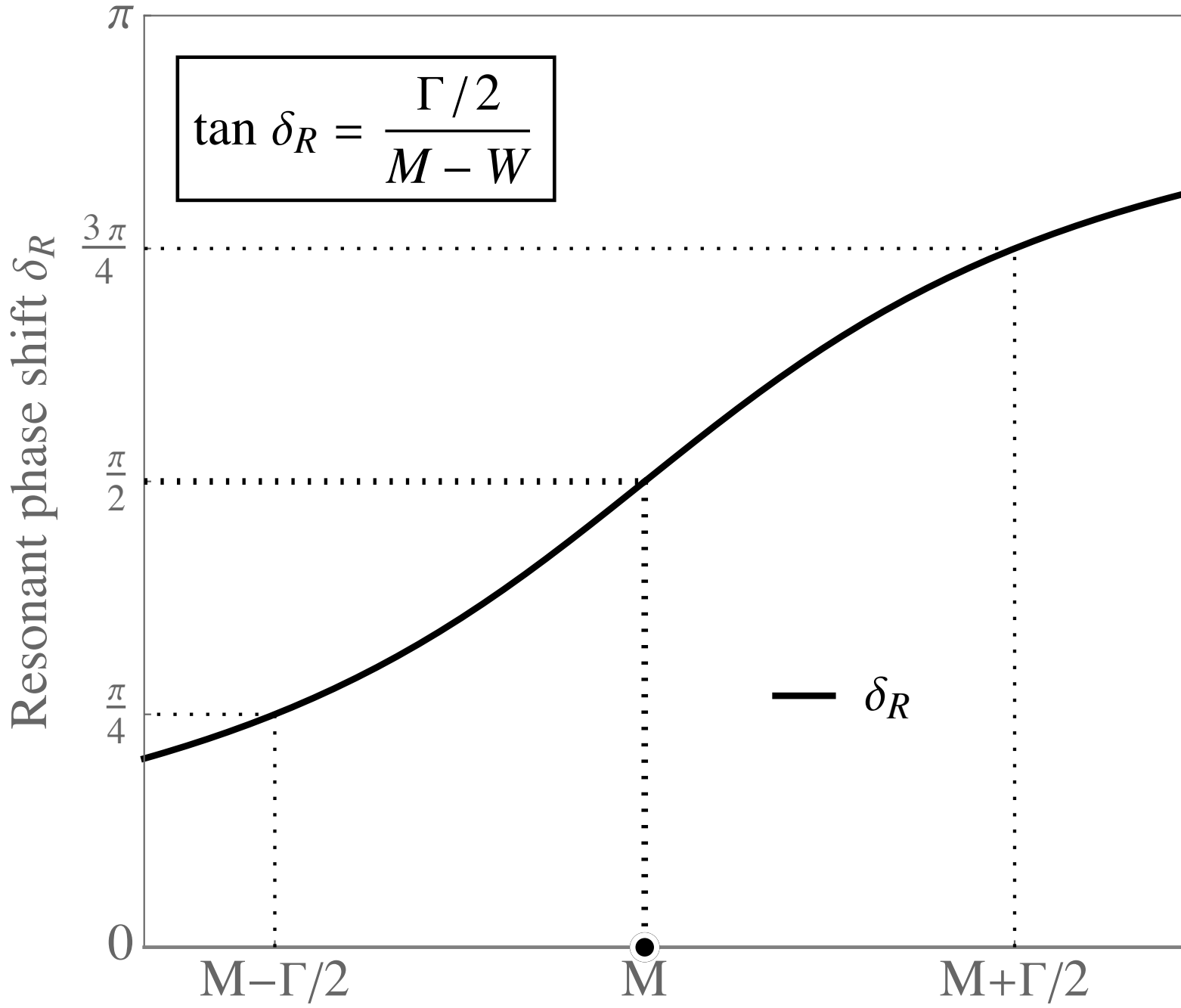
Saša Ceci

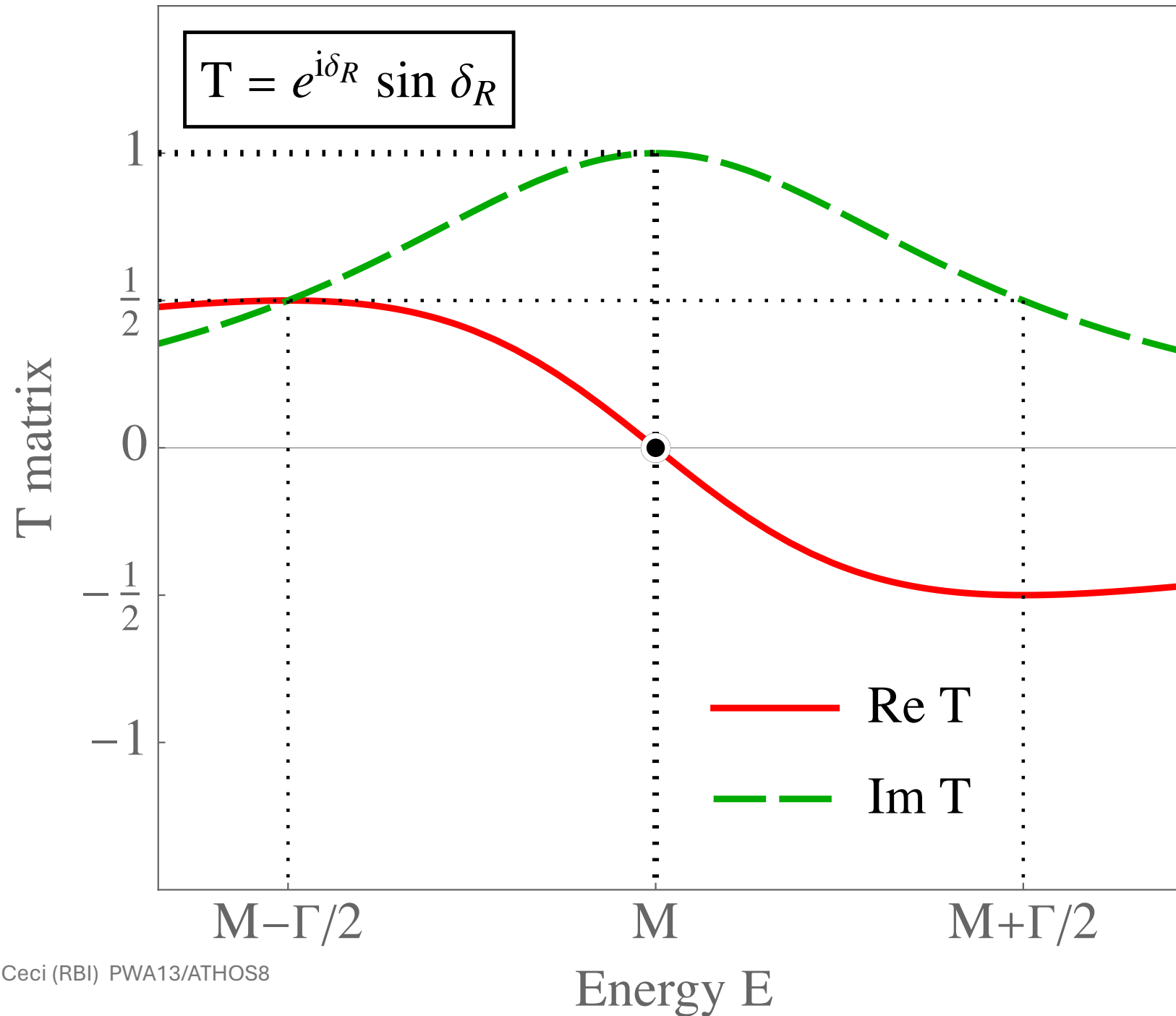
Ruder Bošković Institute



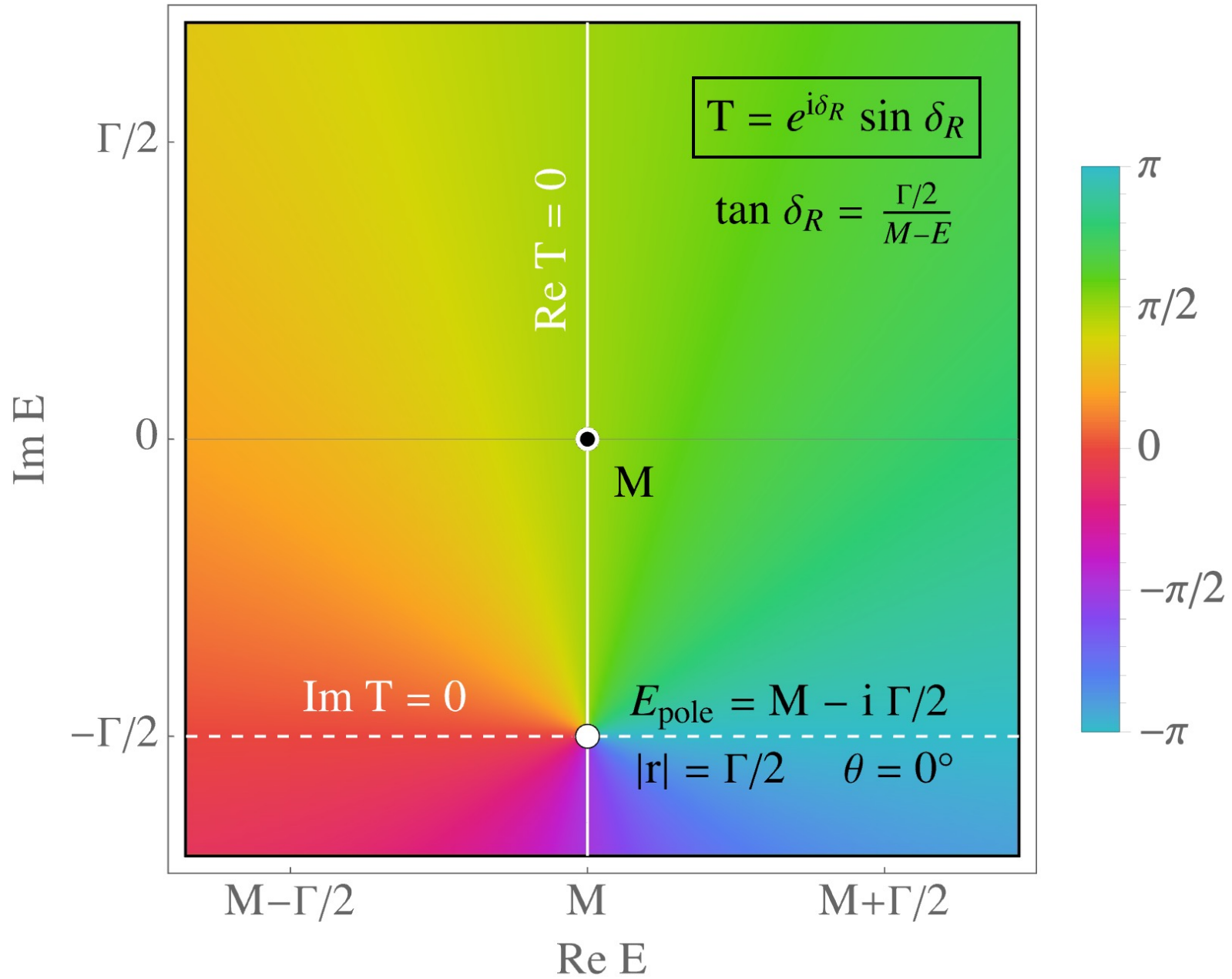
Ruder
Bošković
Institute



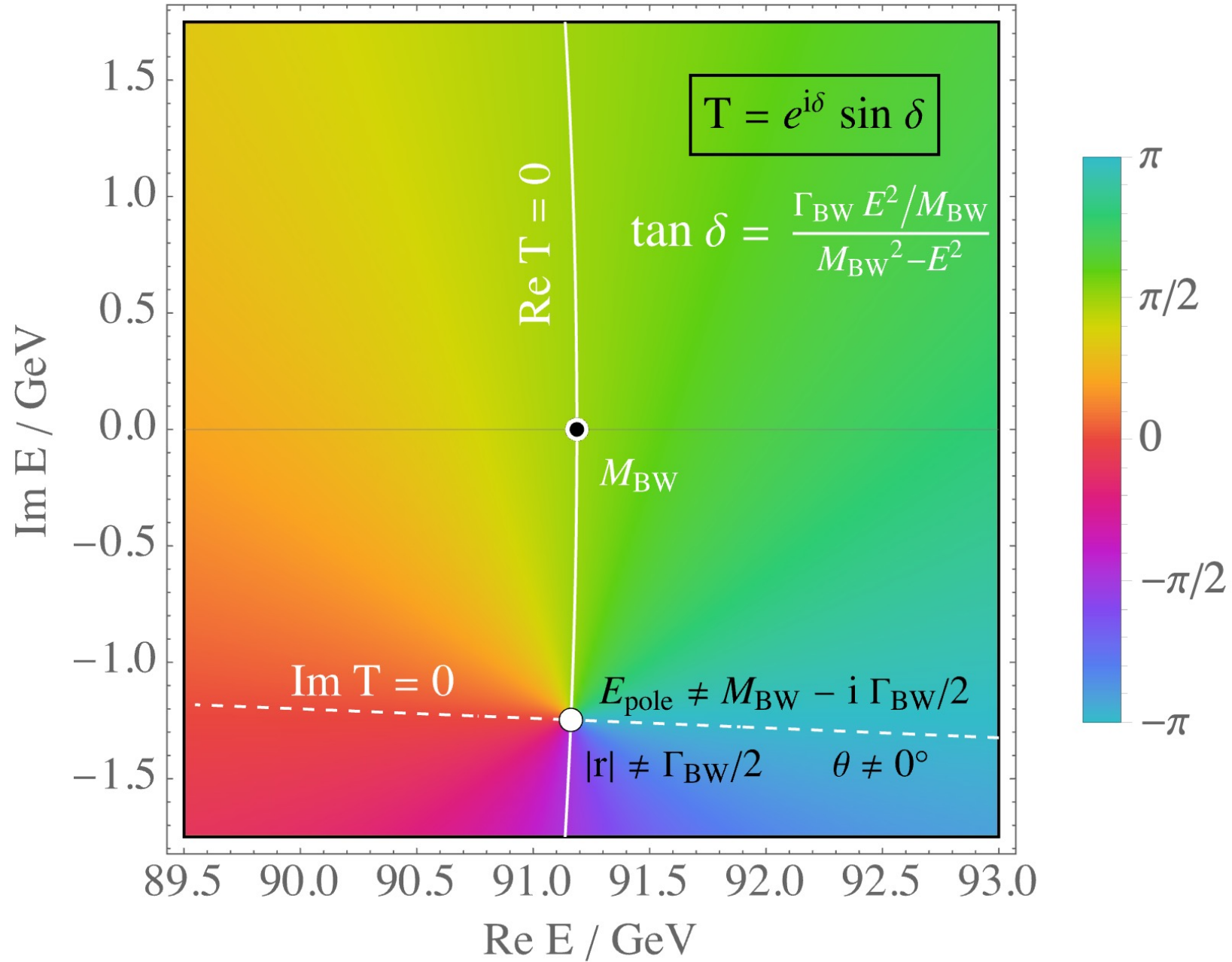




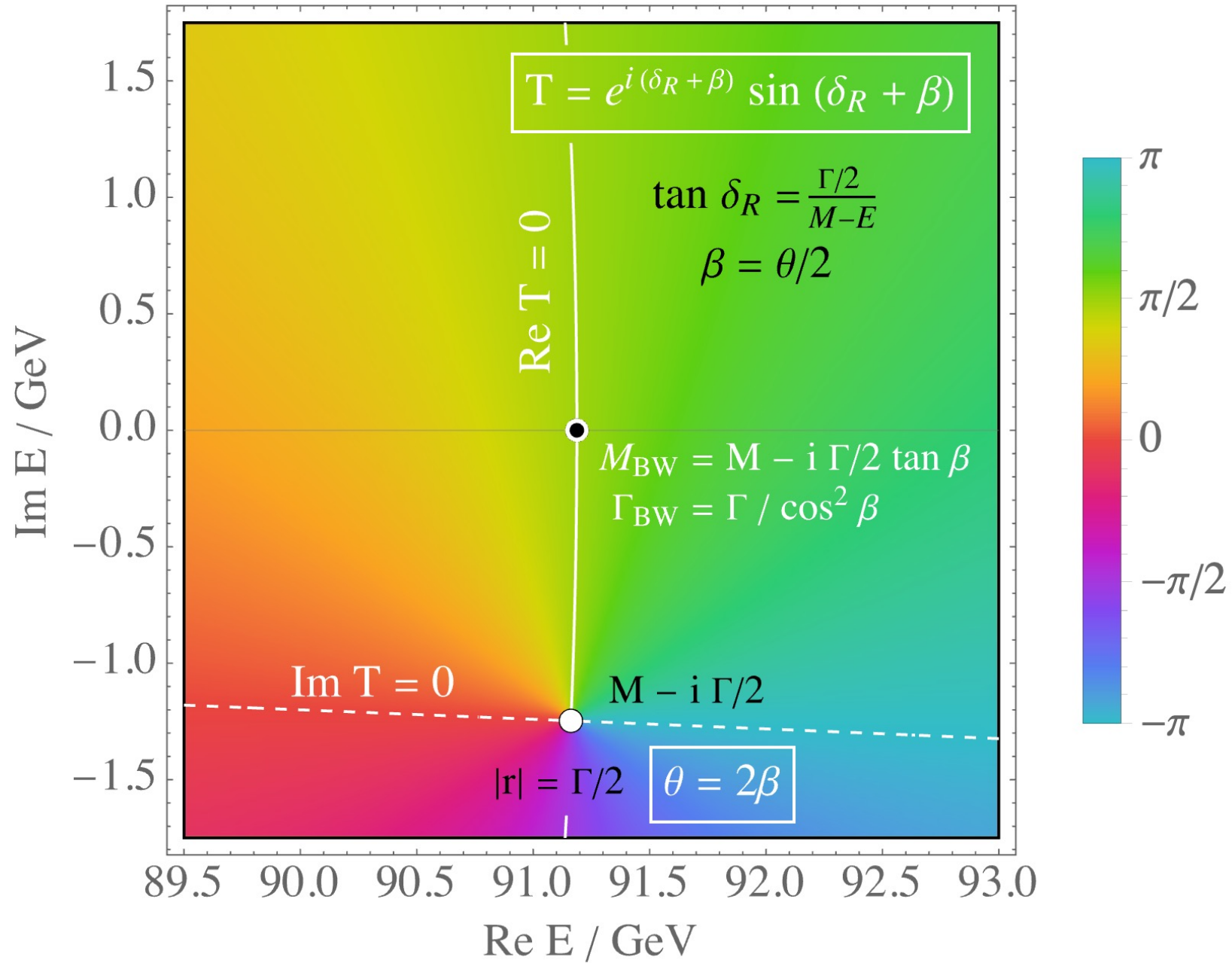
T-matrix complex phase plot

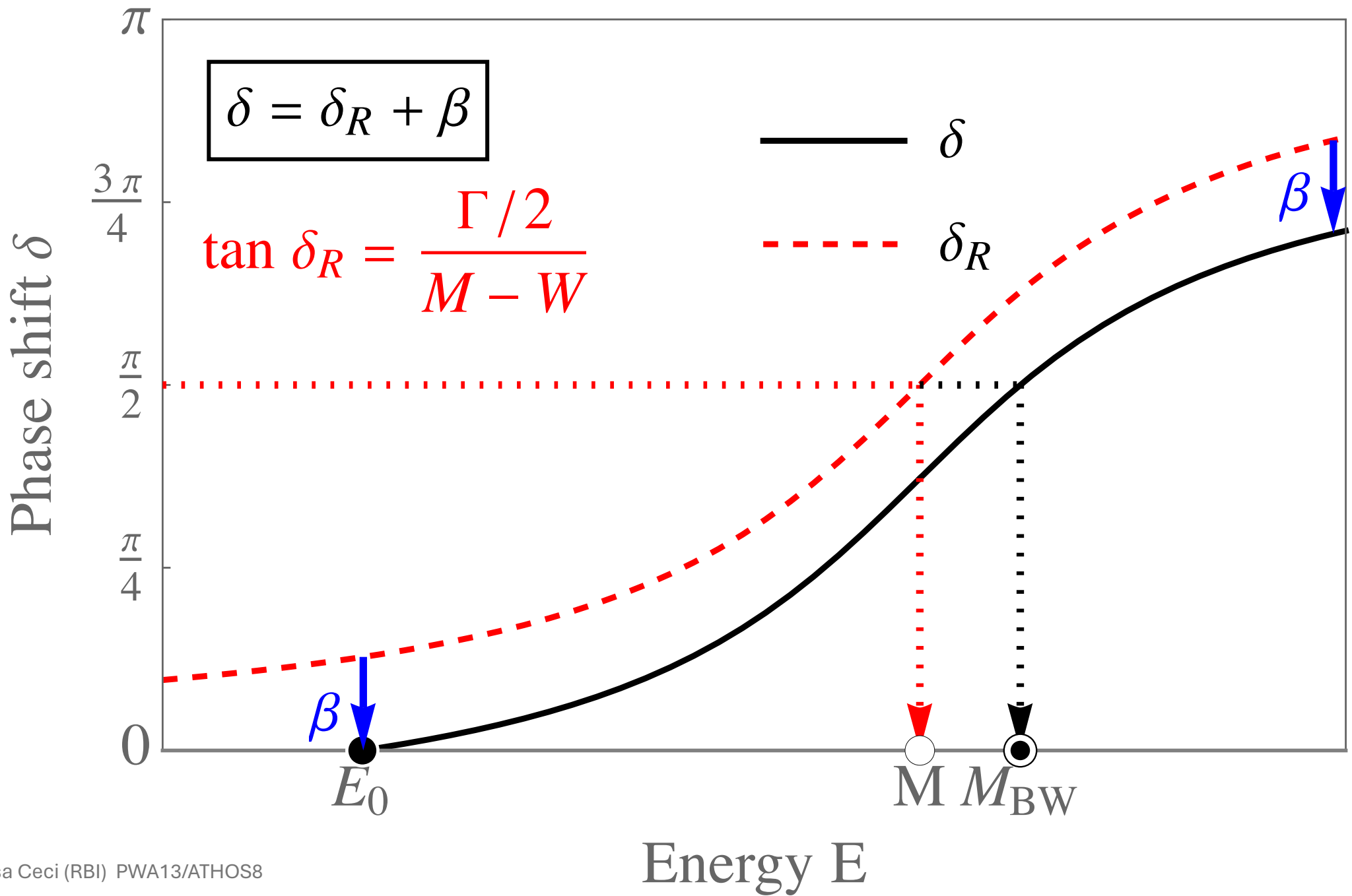


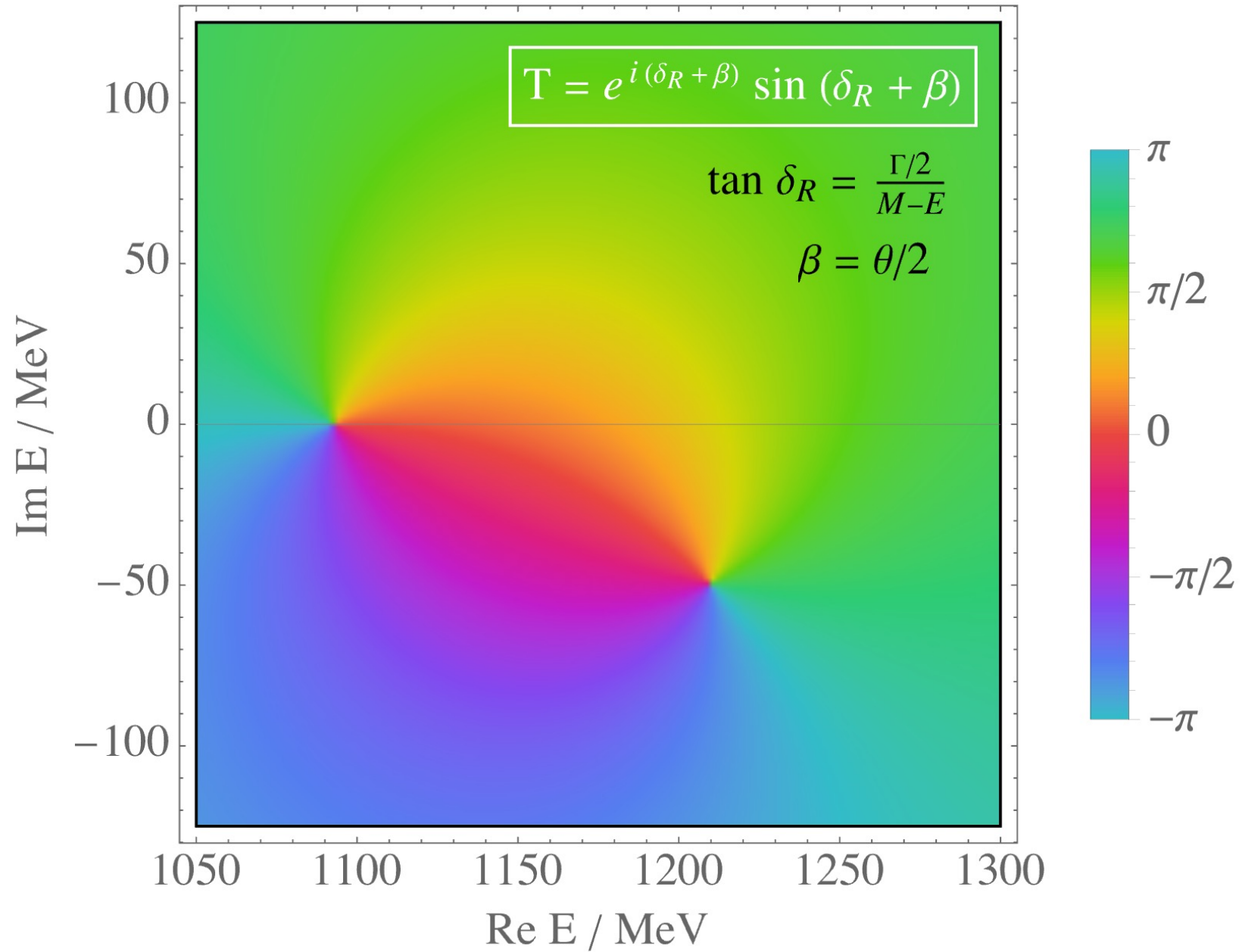
Realistic Z boson

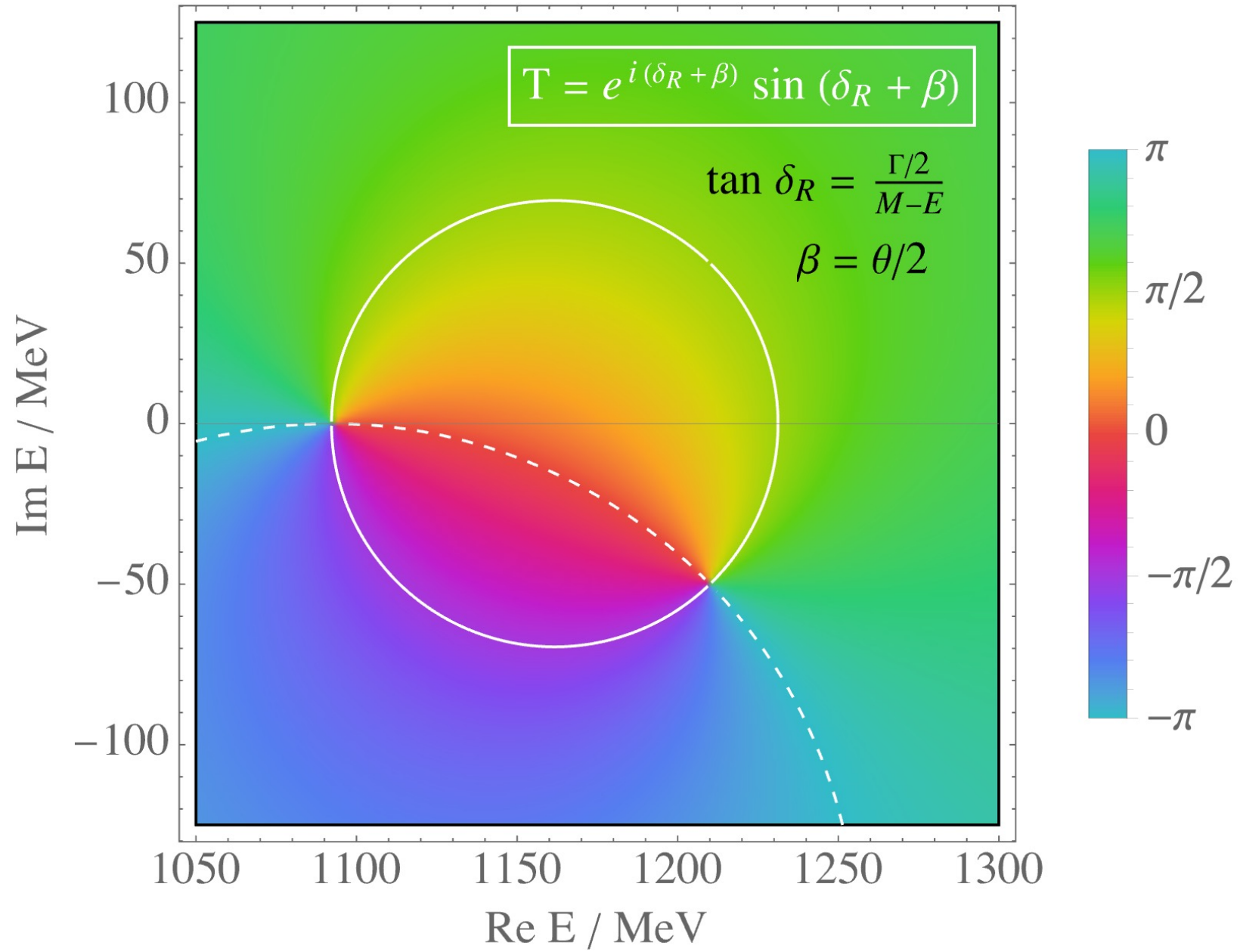


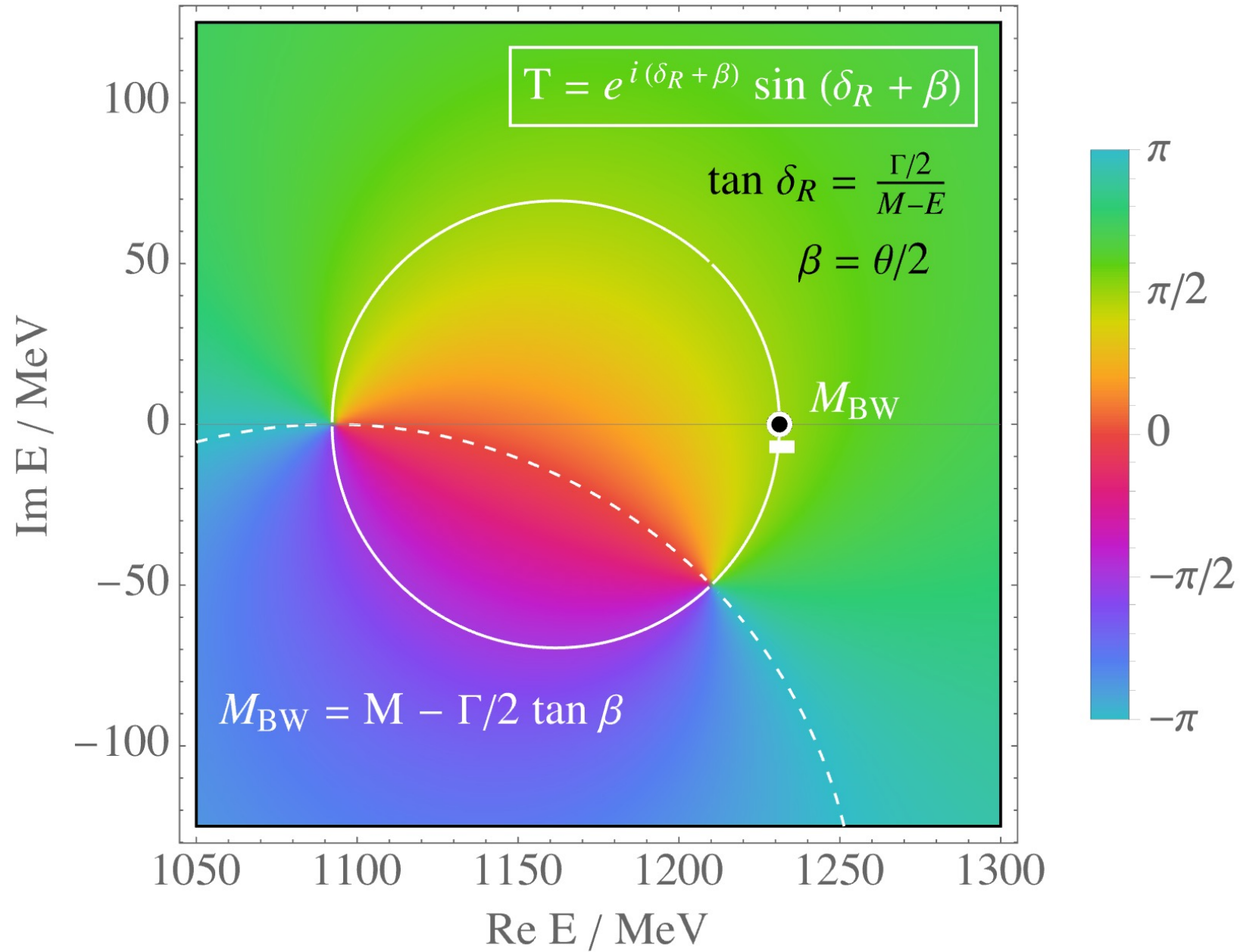
Res + Bckg for Z boson

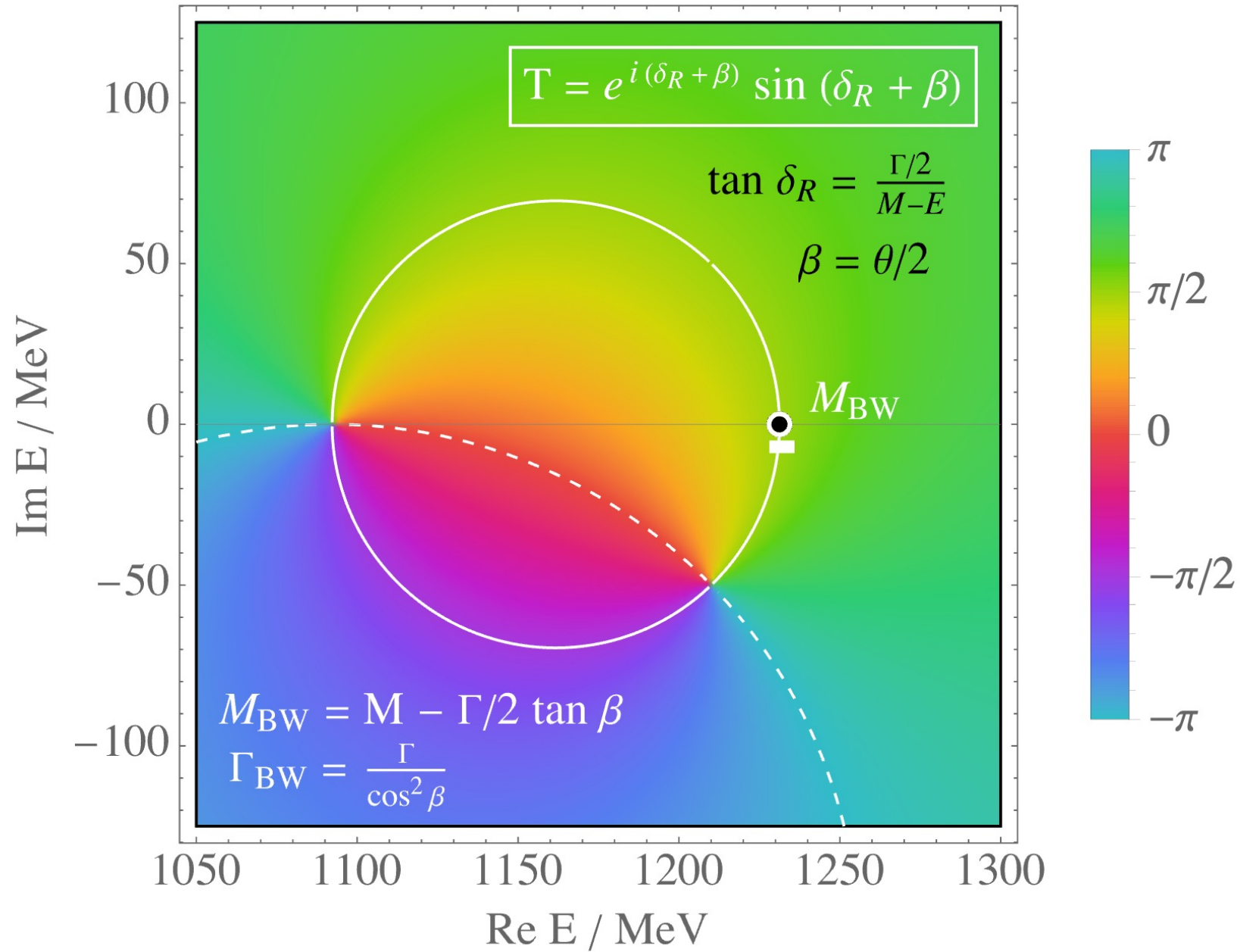


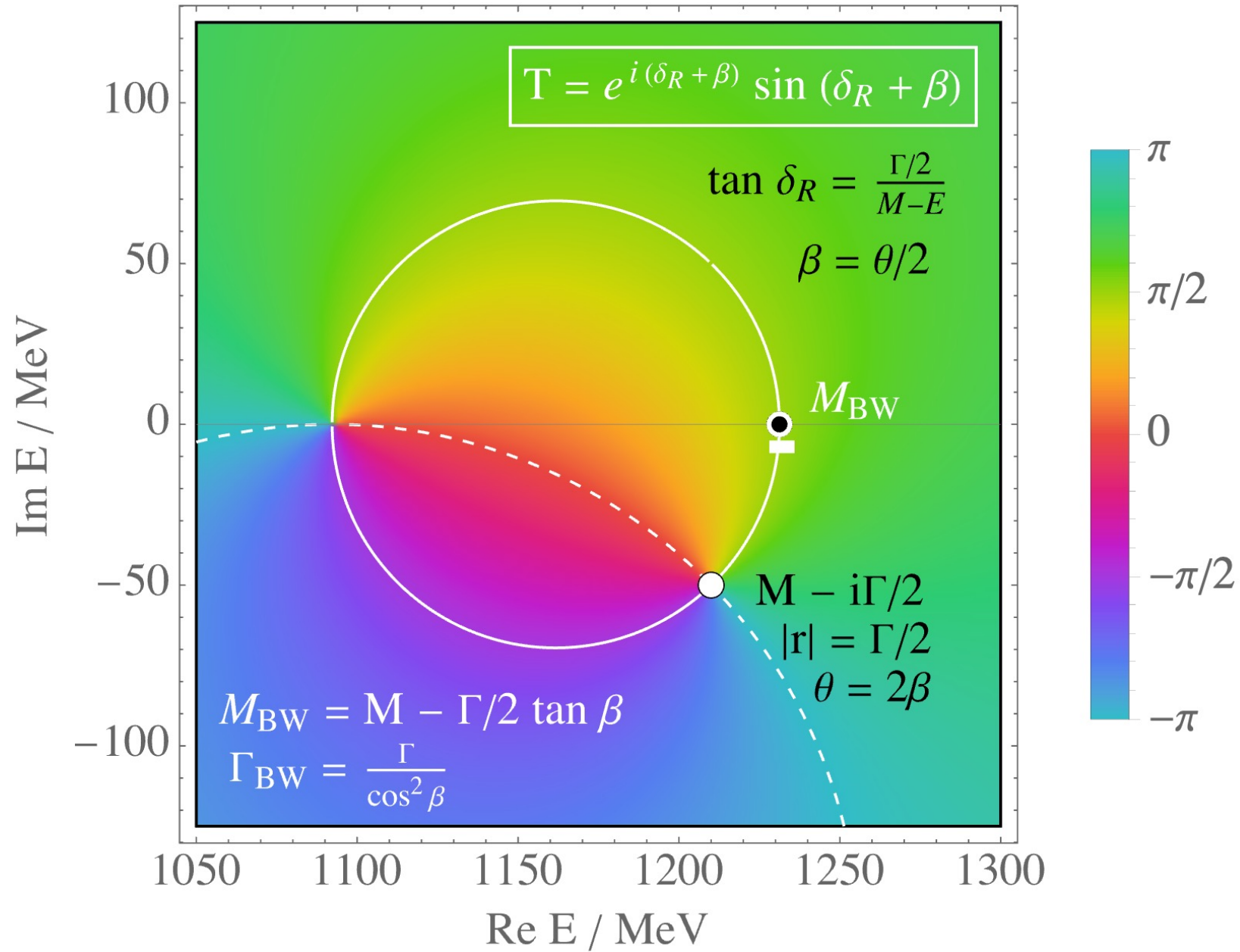


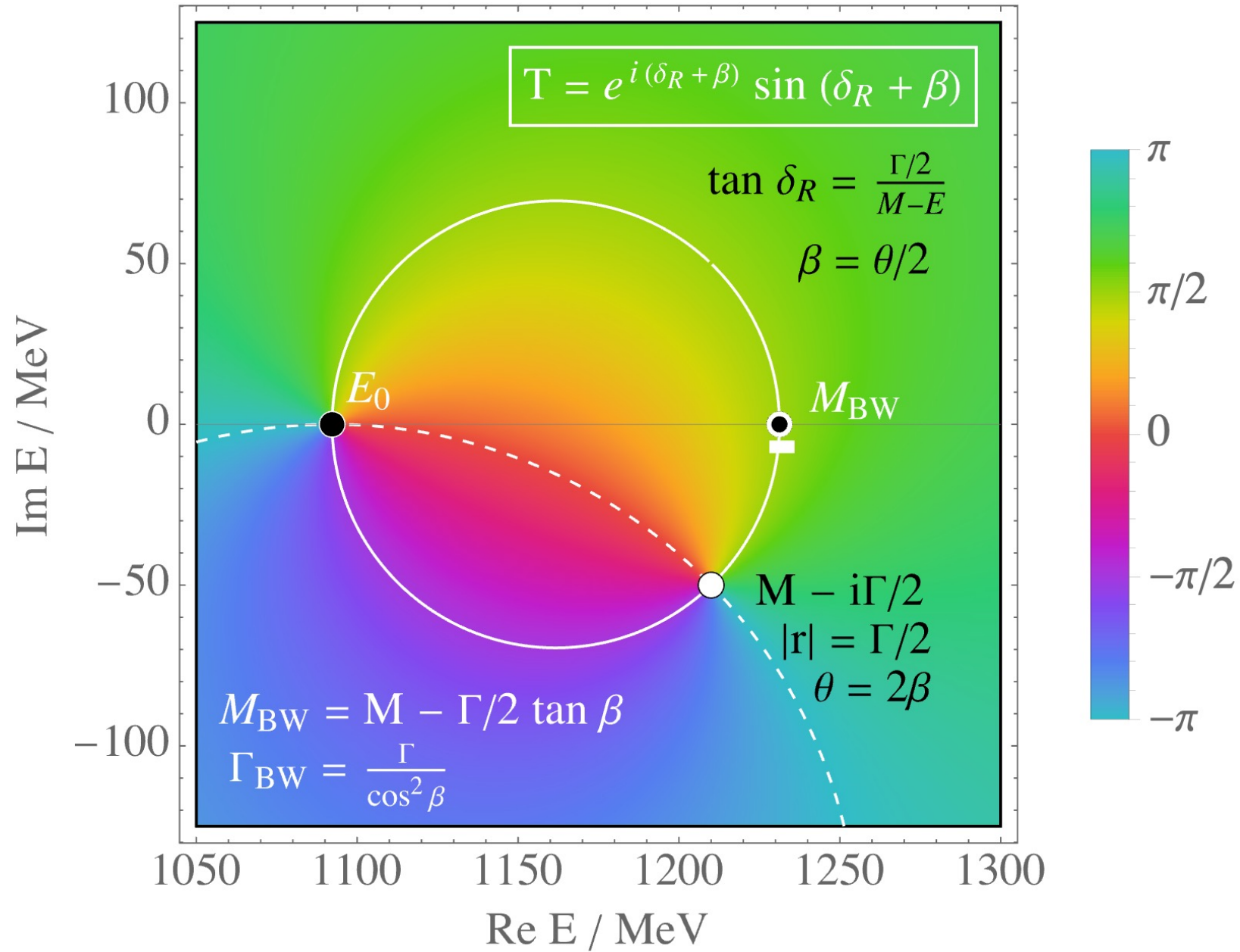


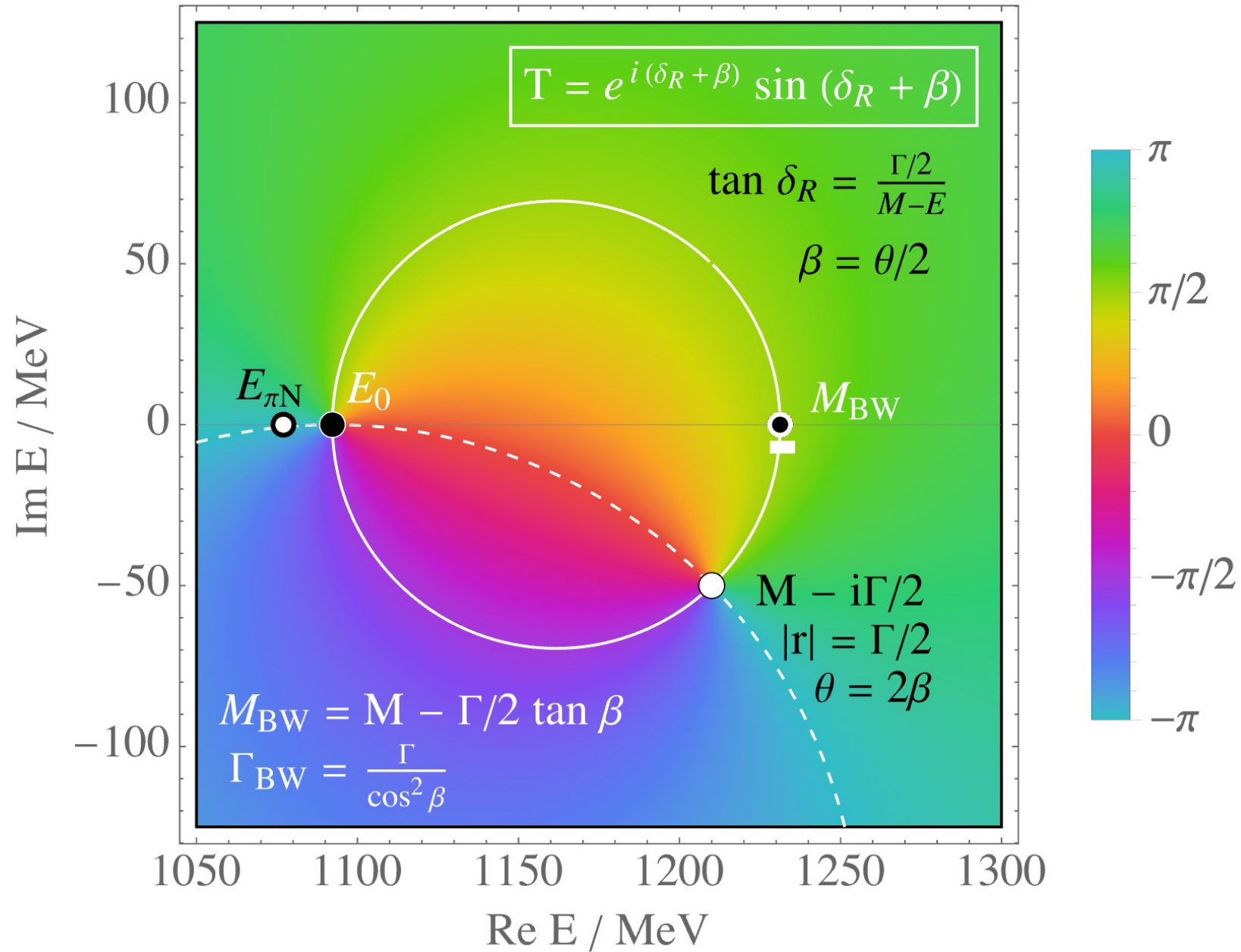




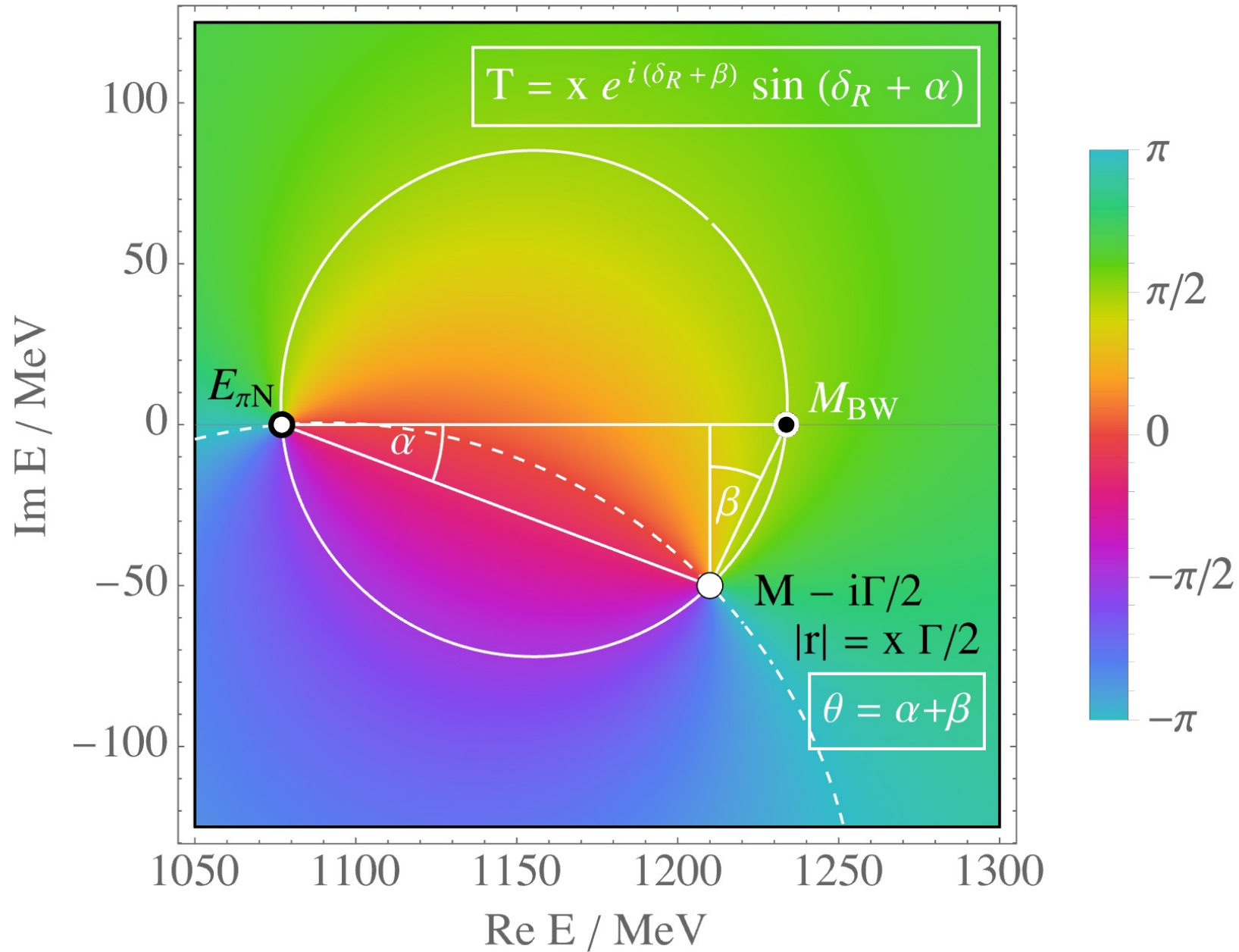


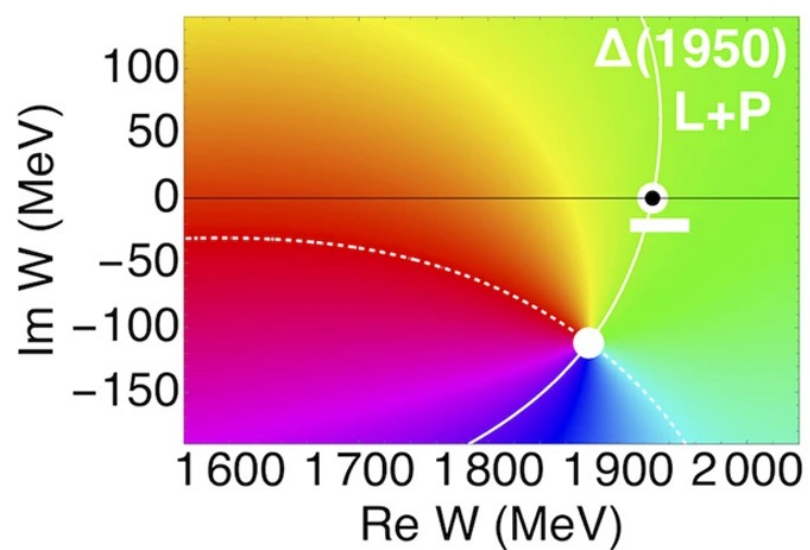
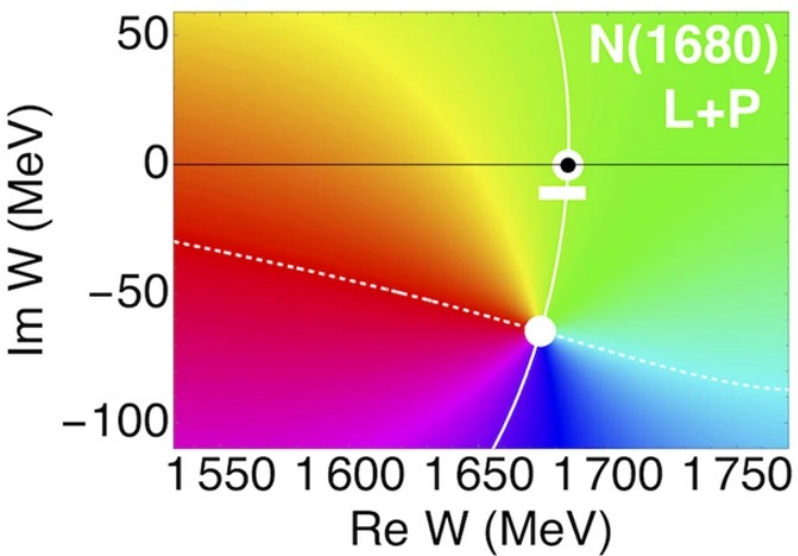
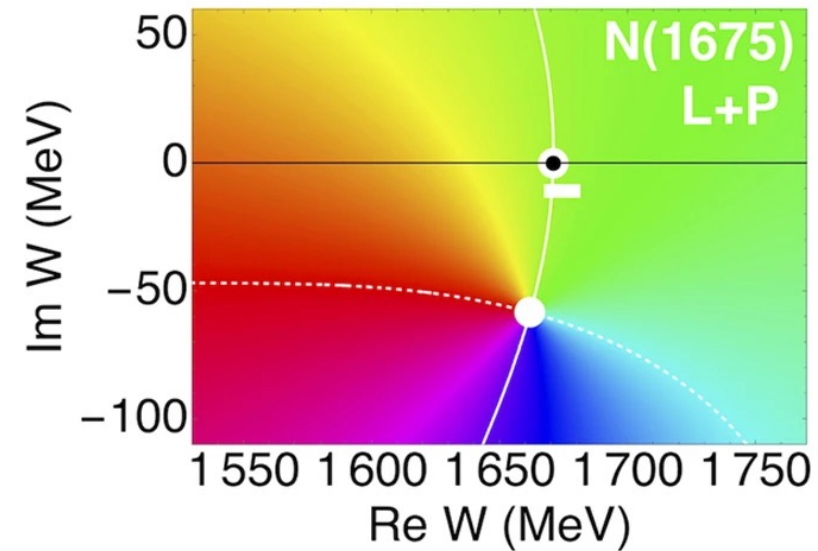
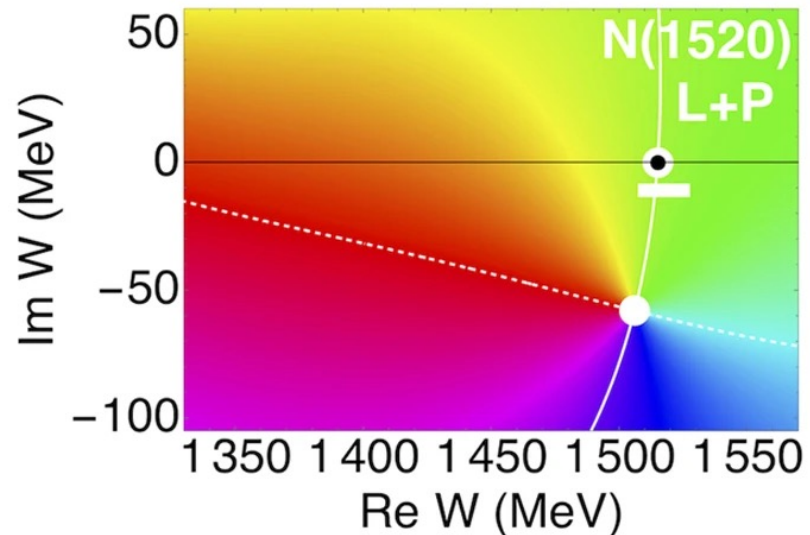
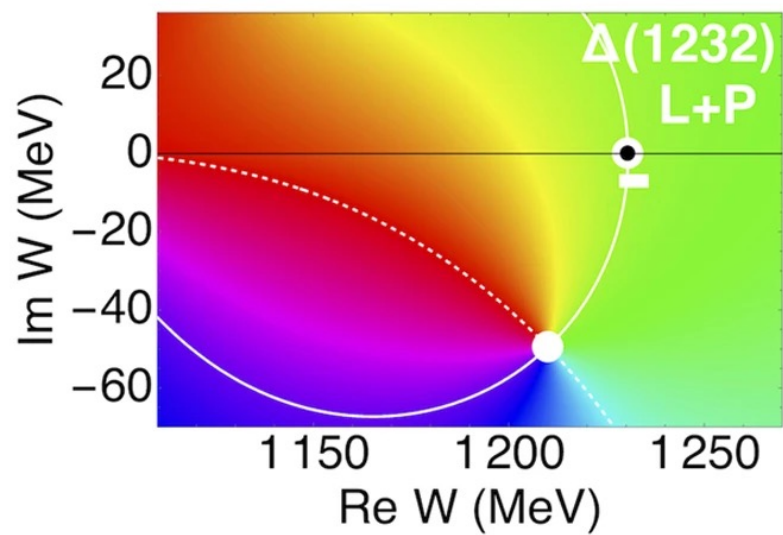


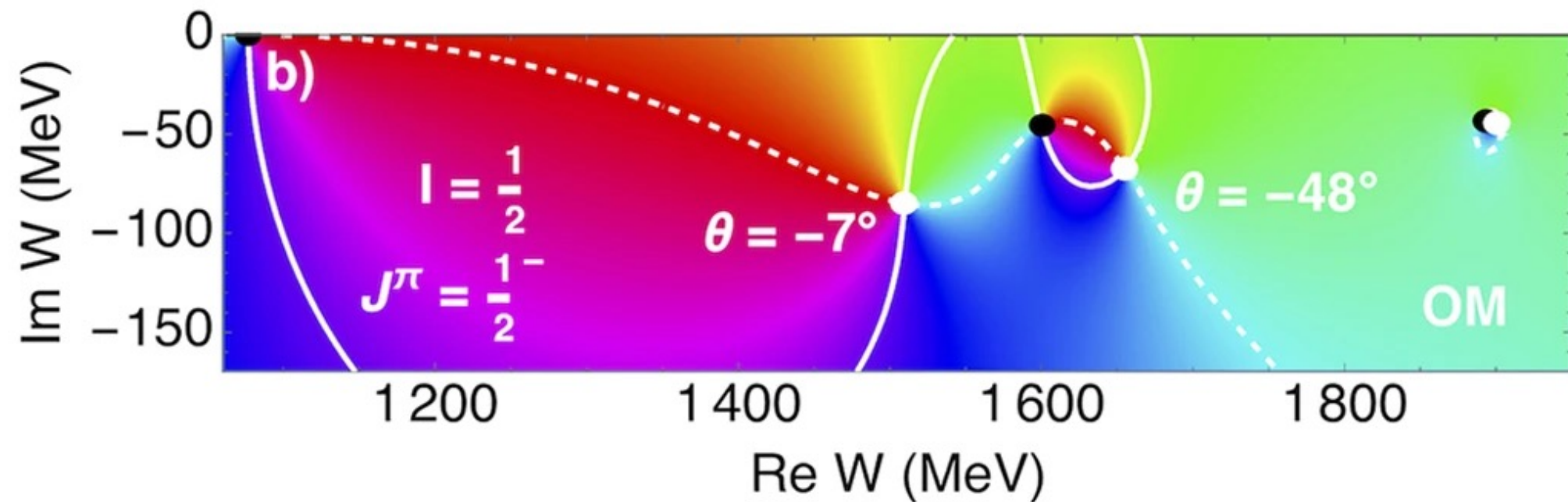
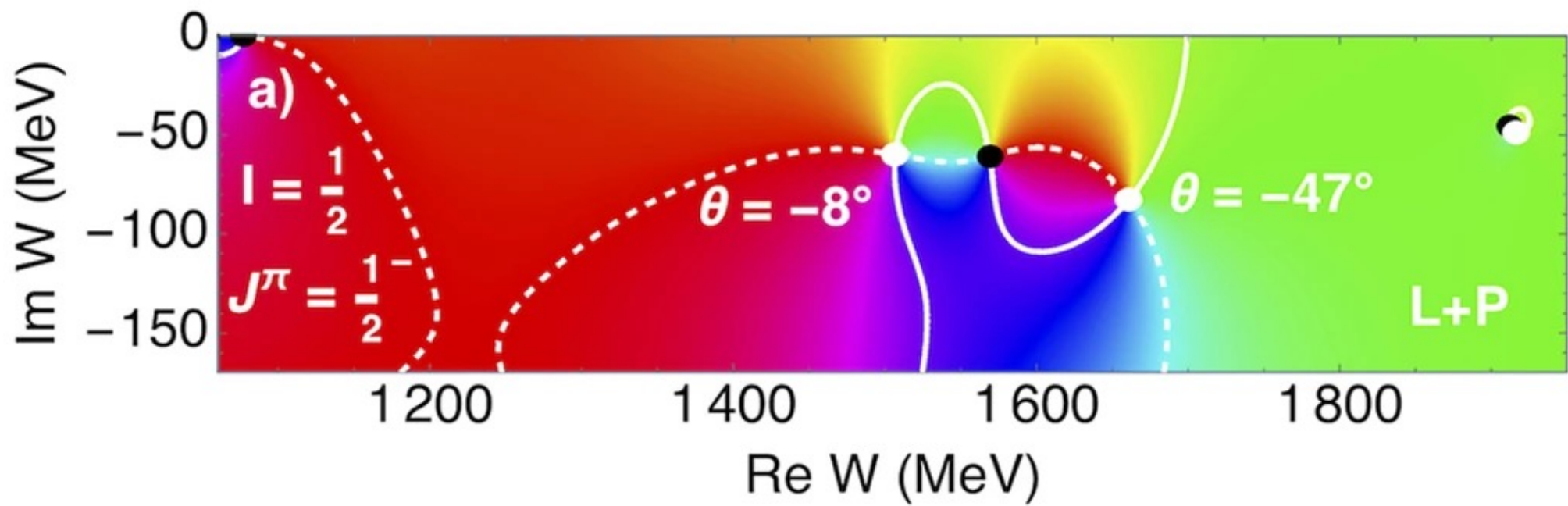


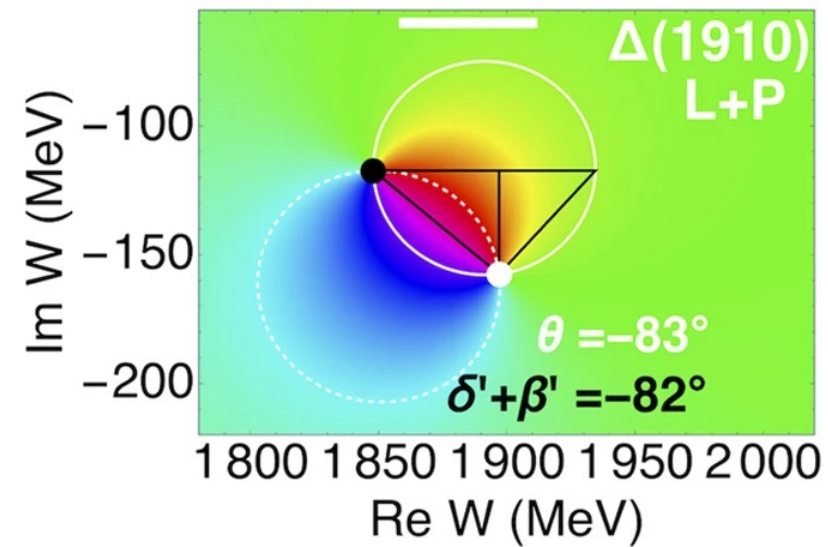
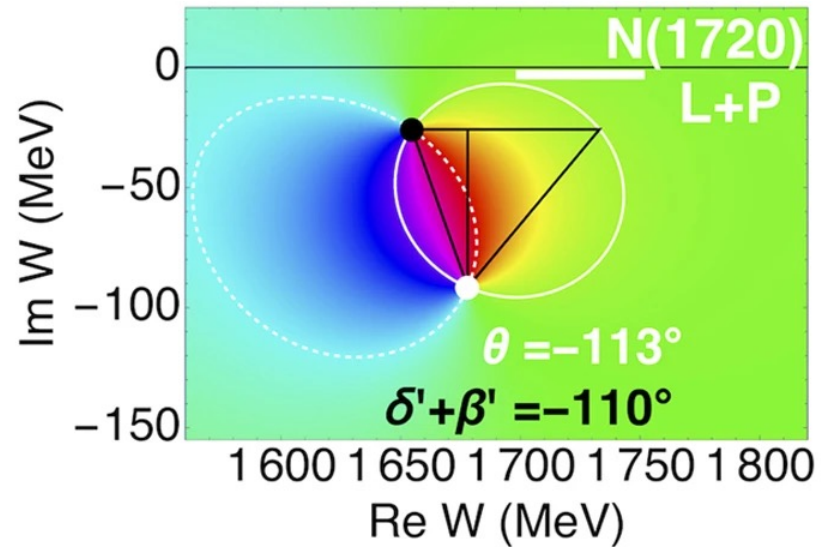
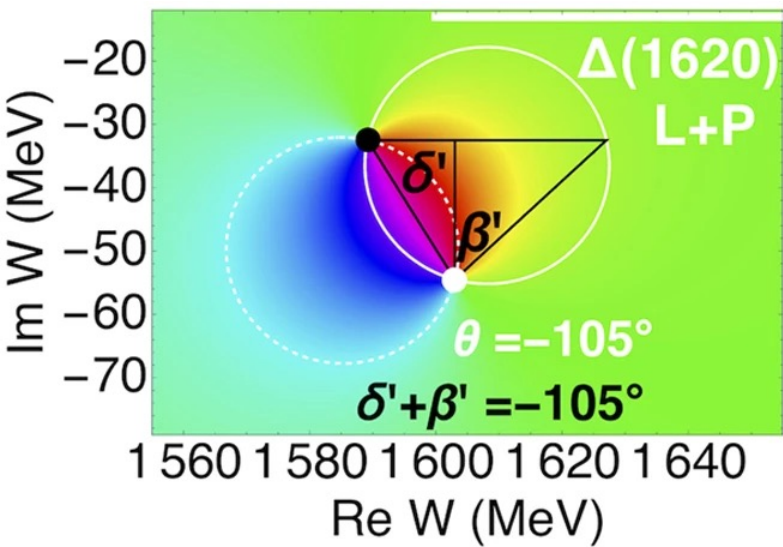


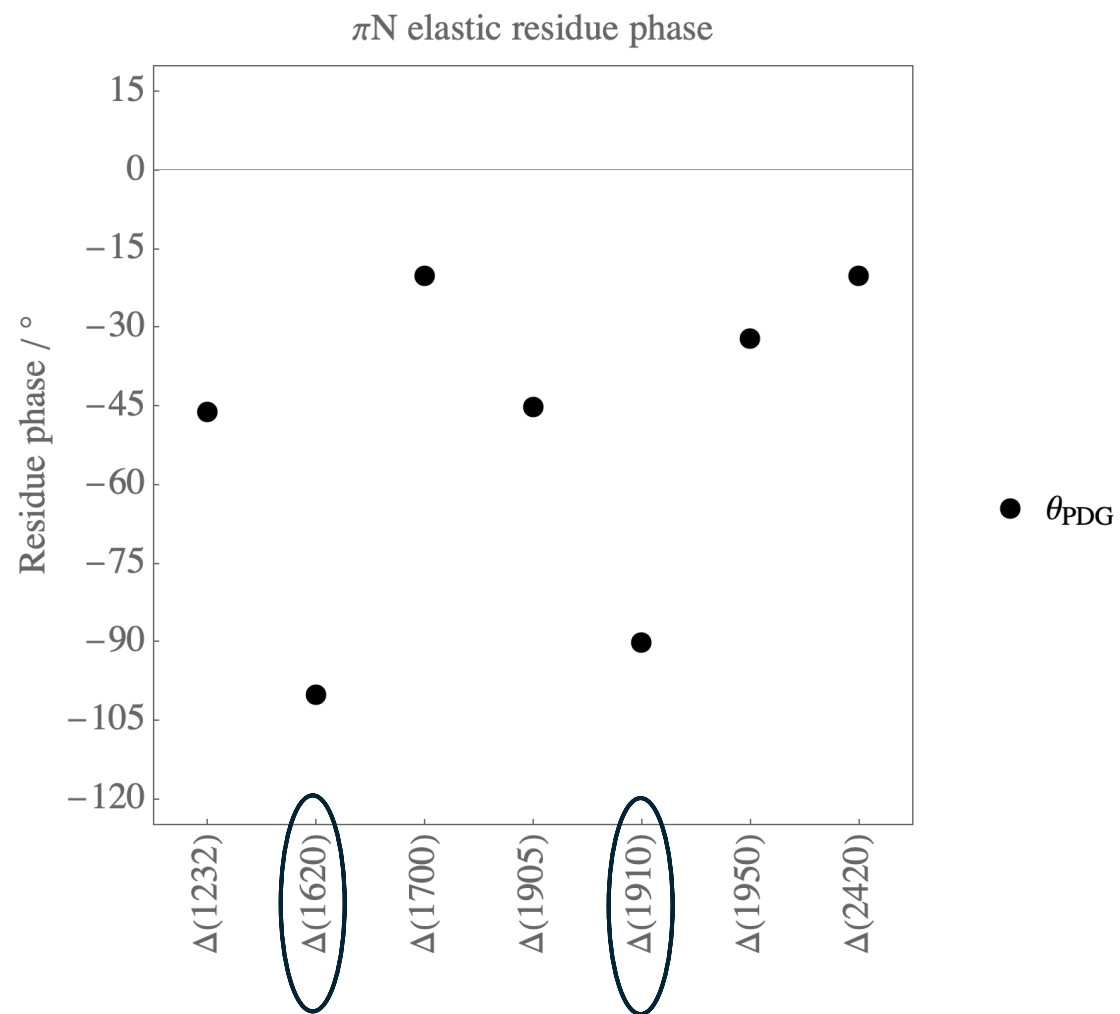
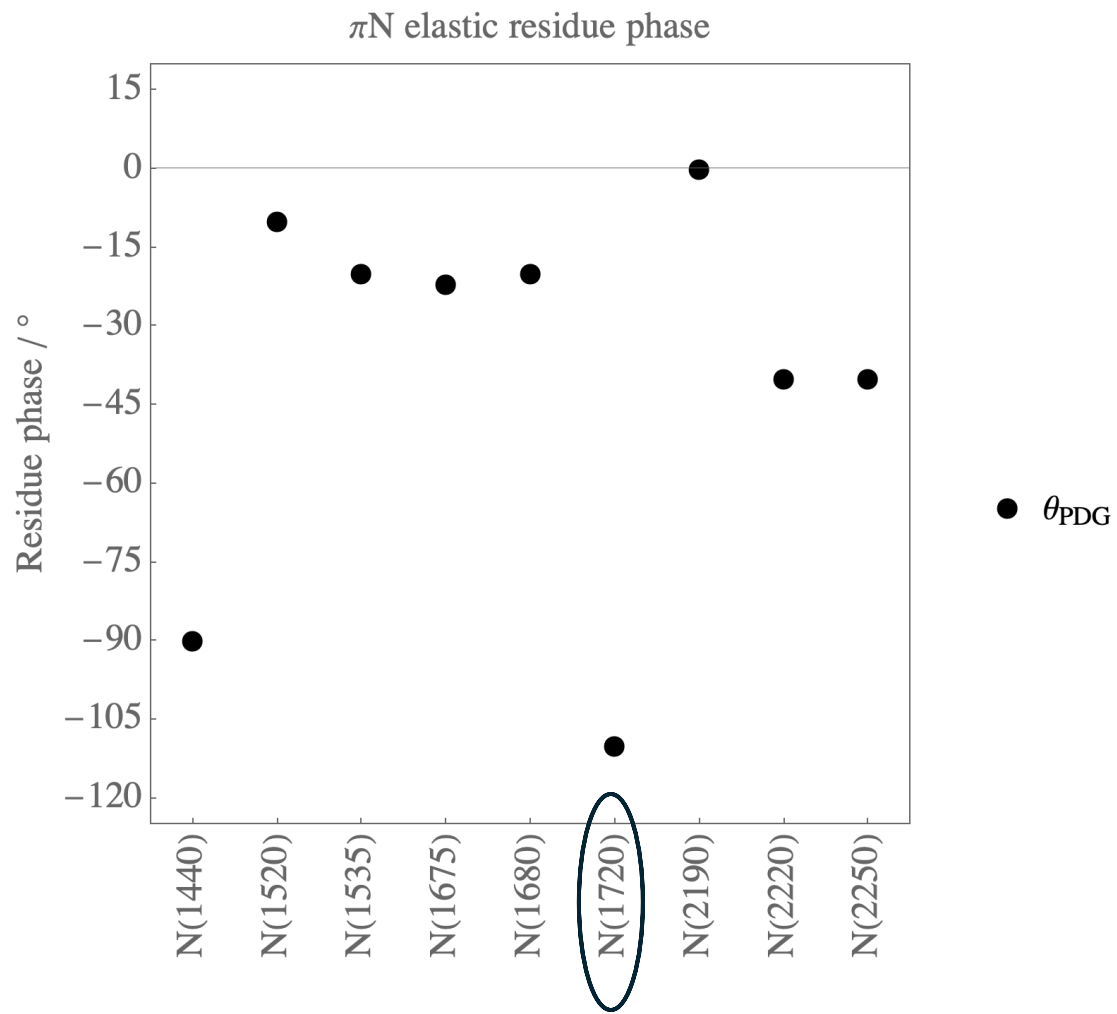
A bit more 'realistic' $\pi N \rightarrow \Delta(1232) \rightarrow \pi N$

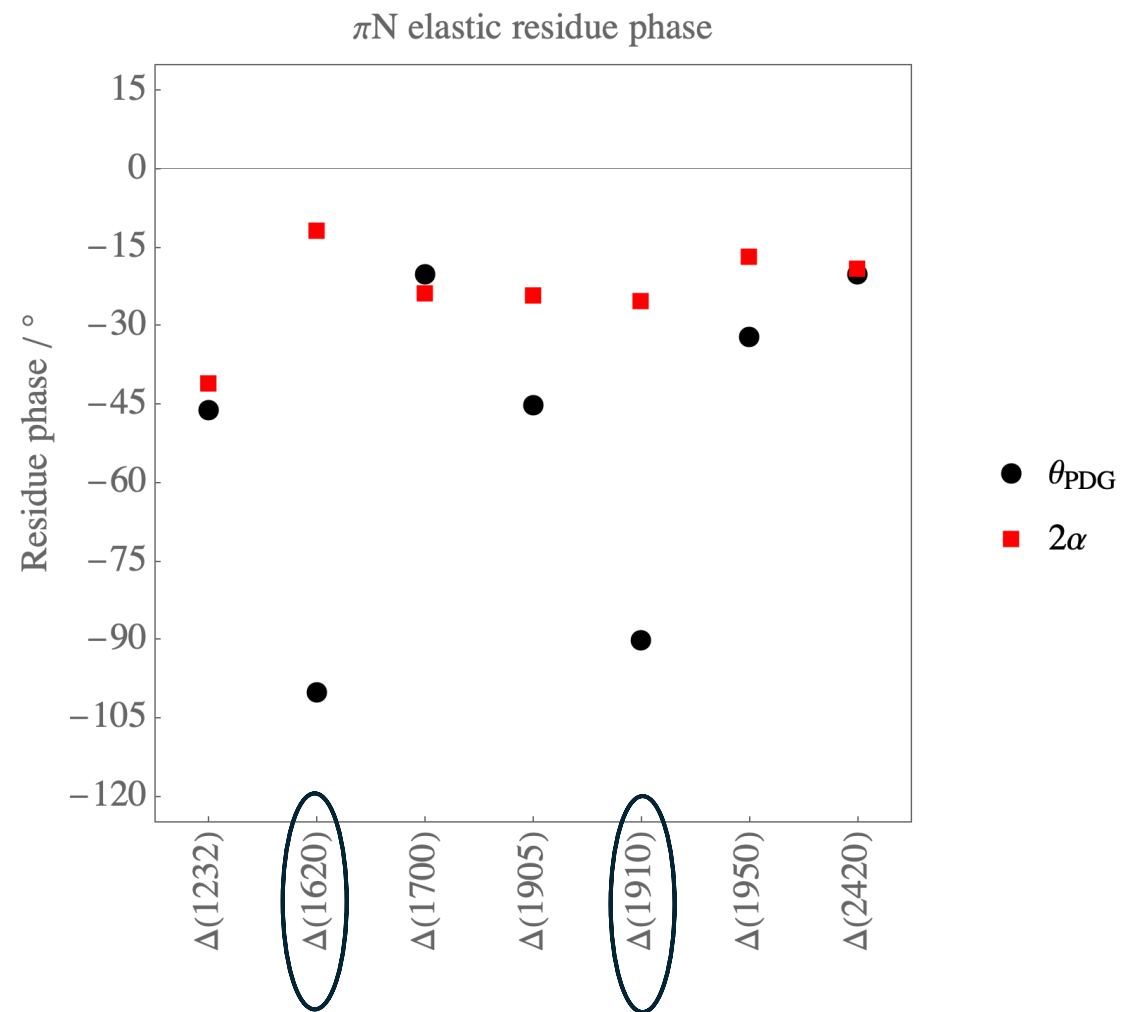
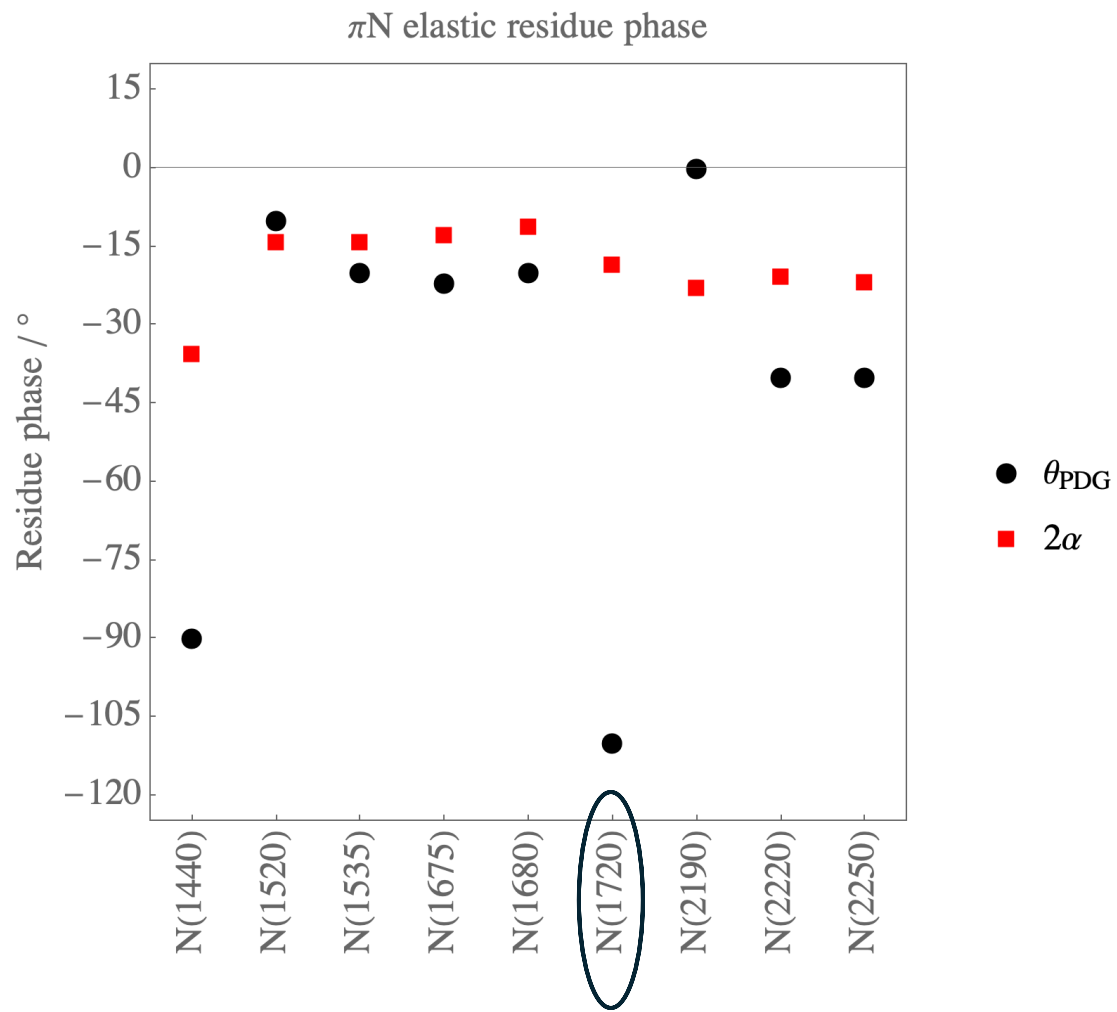


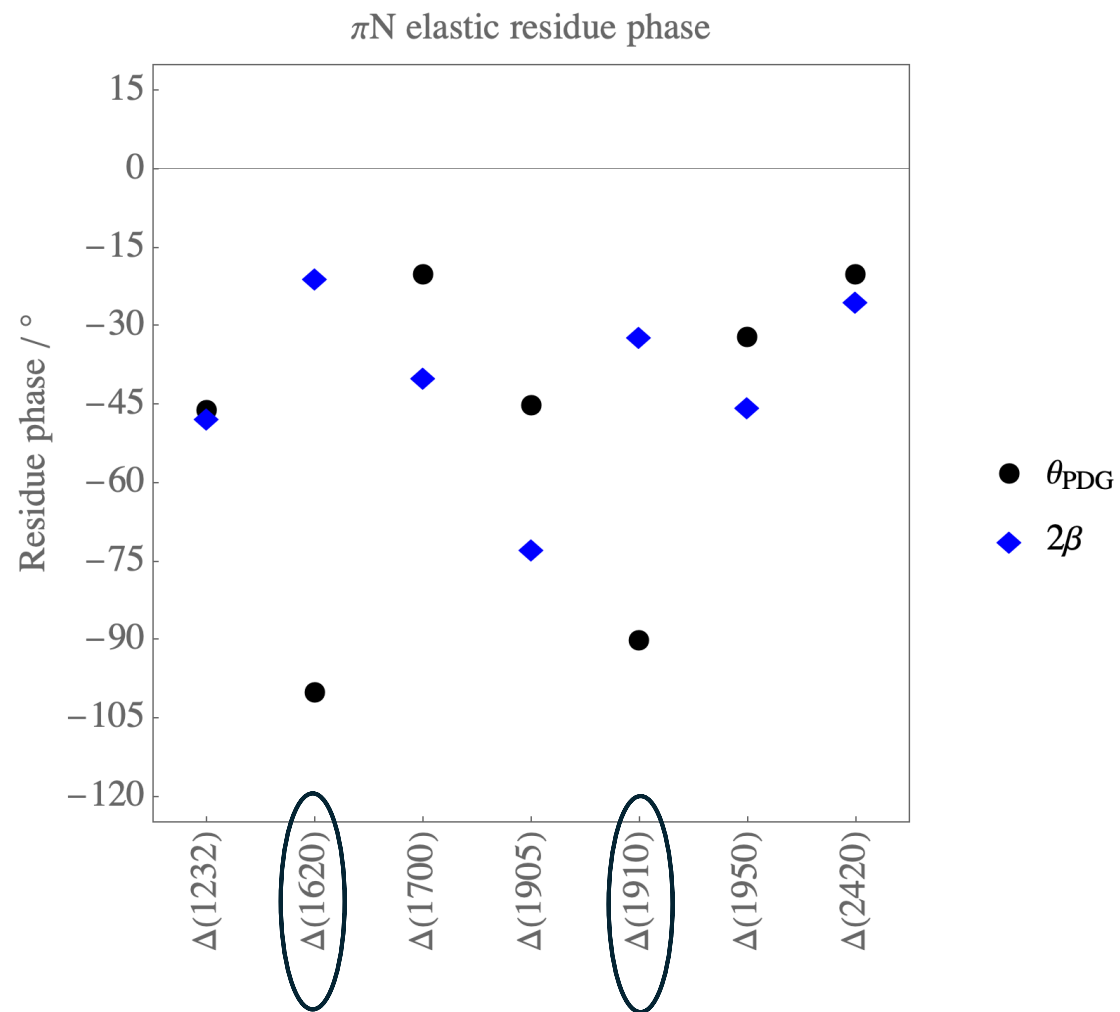
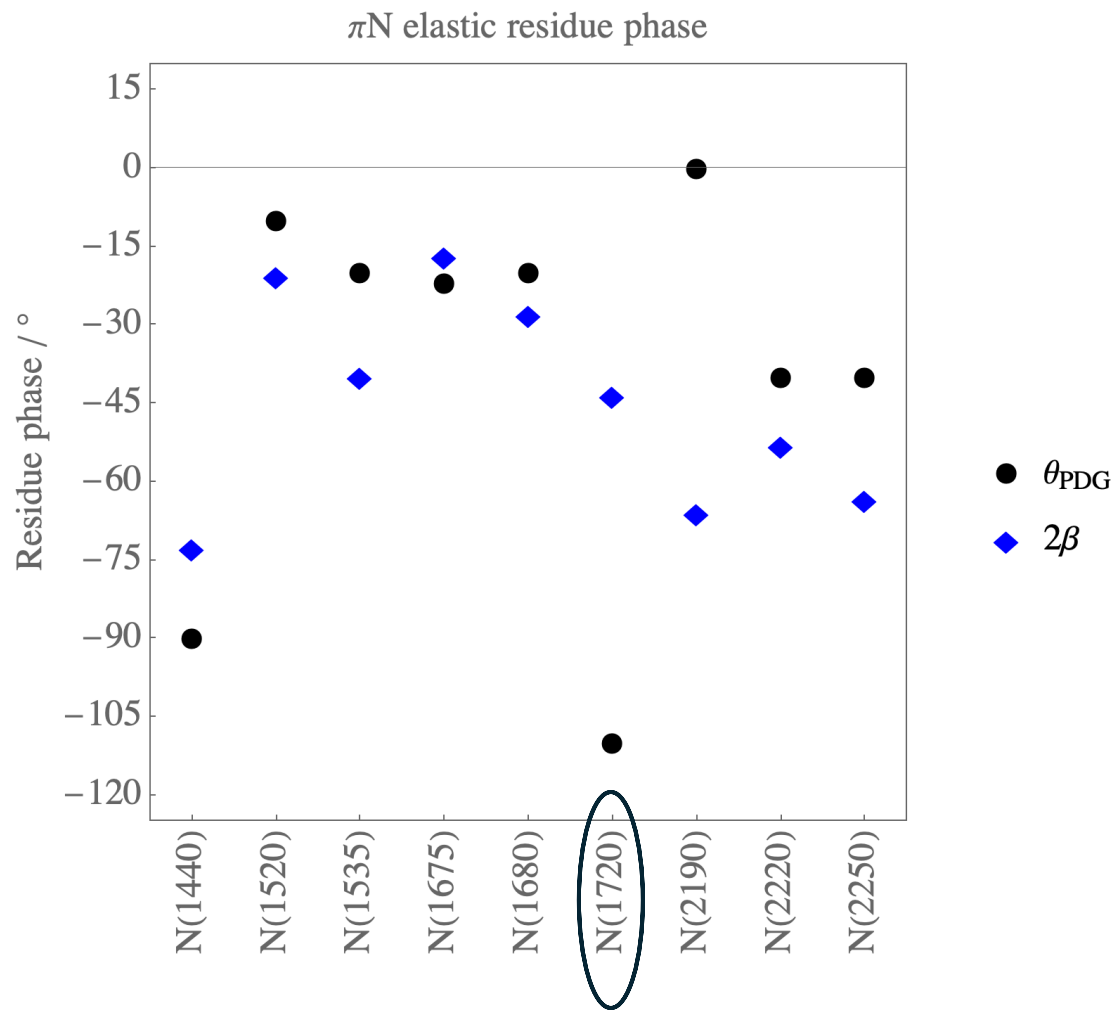


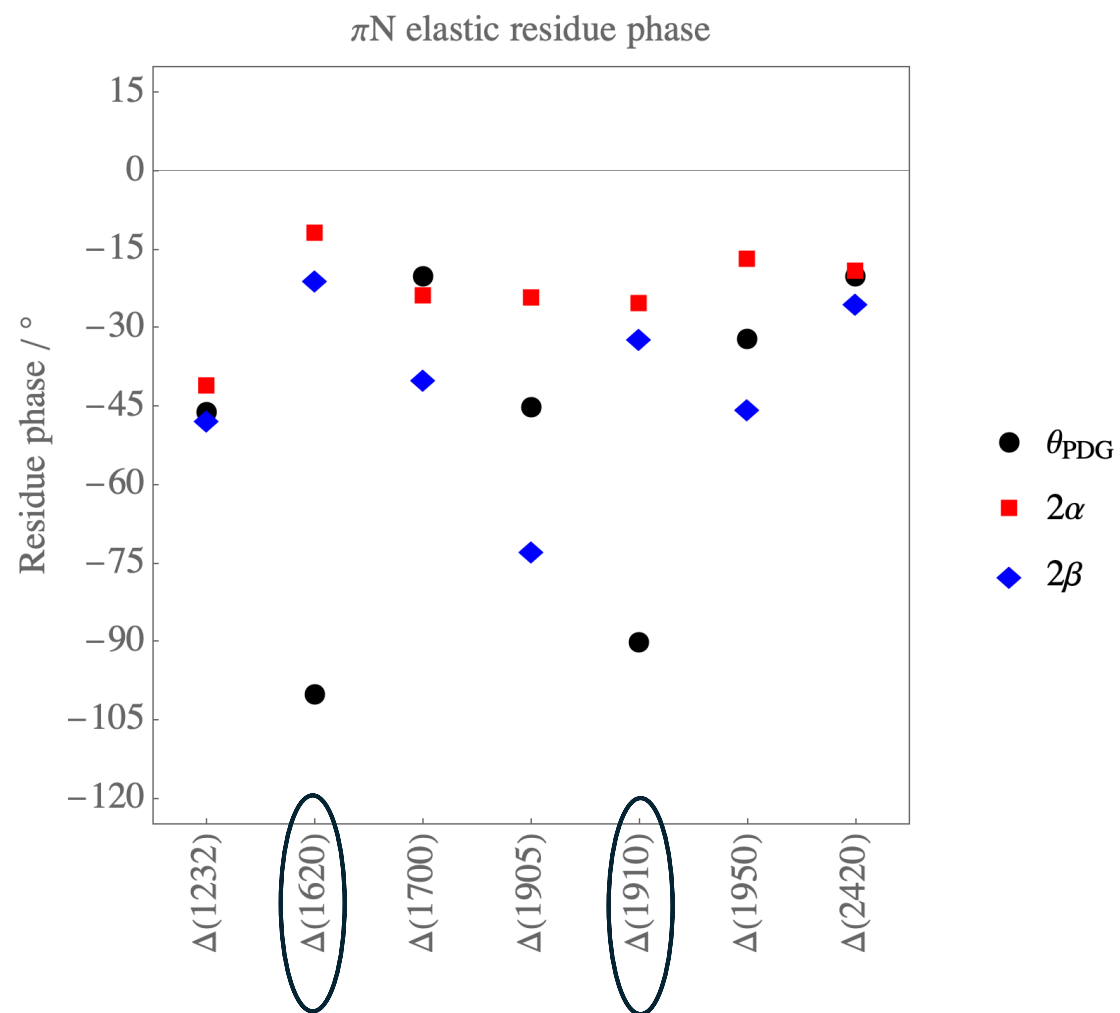
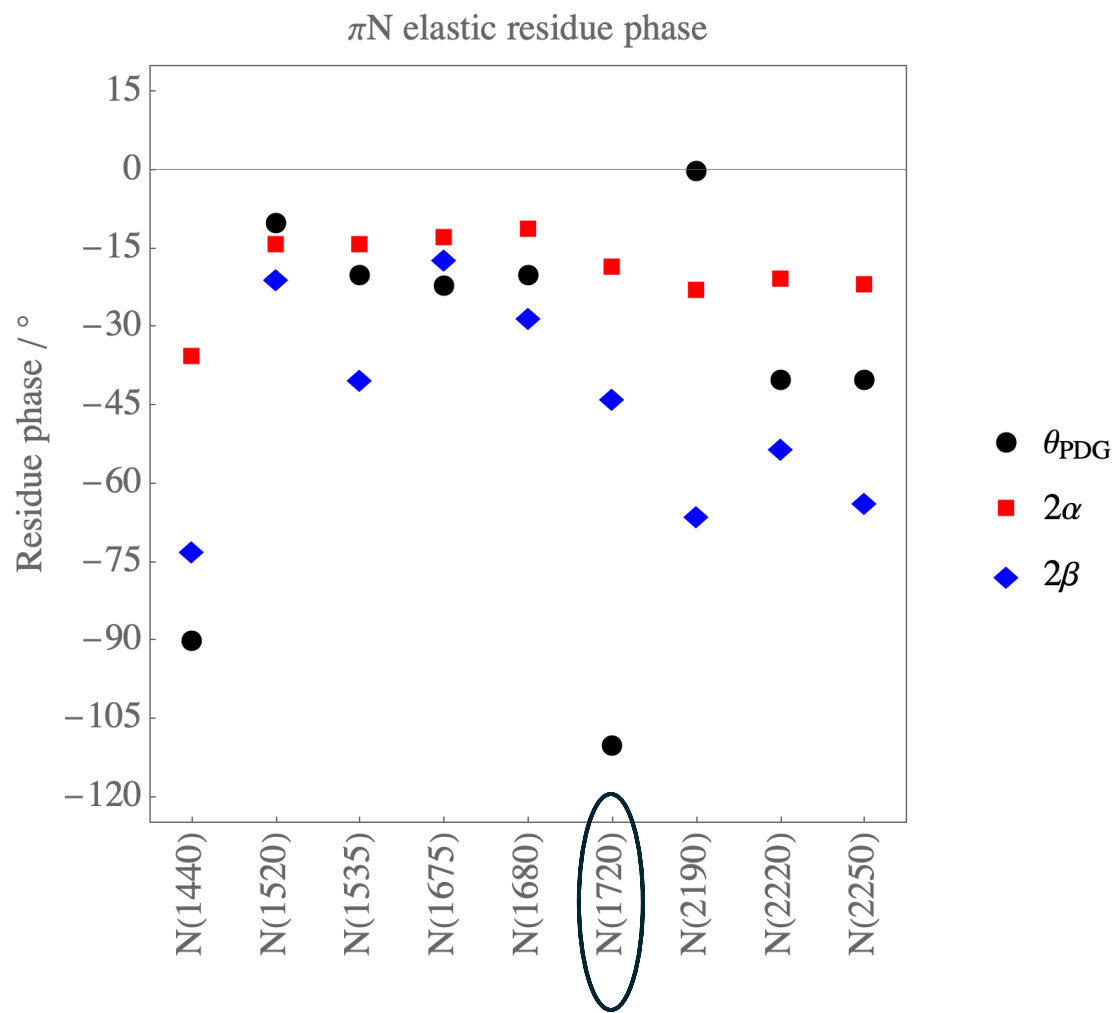


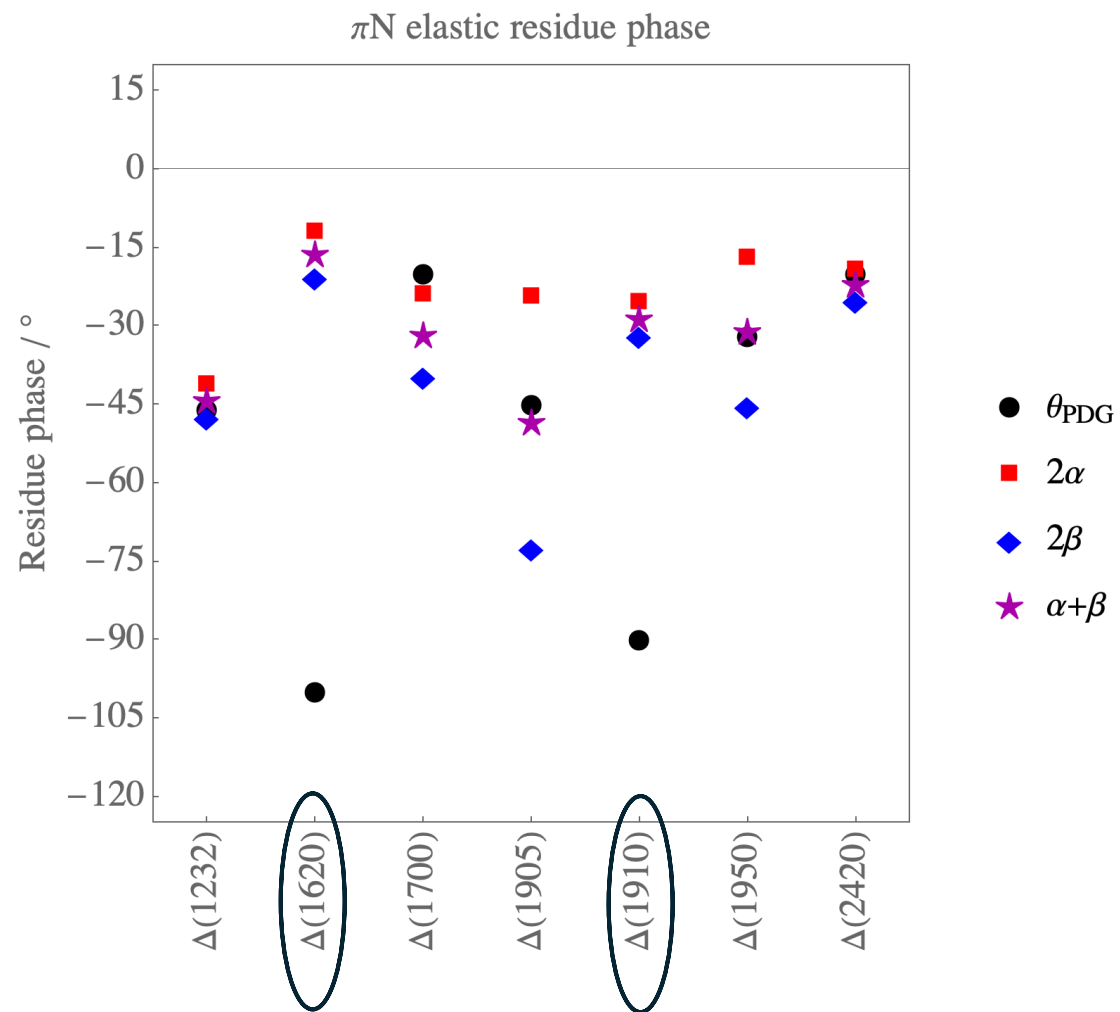
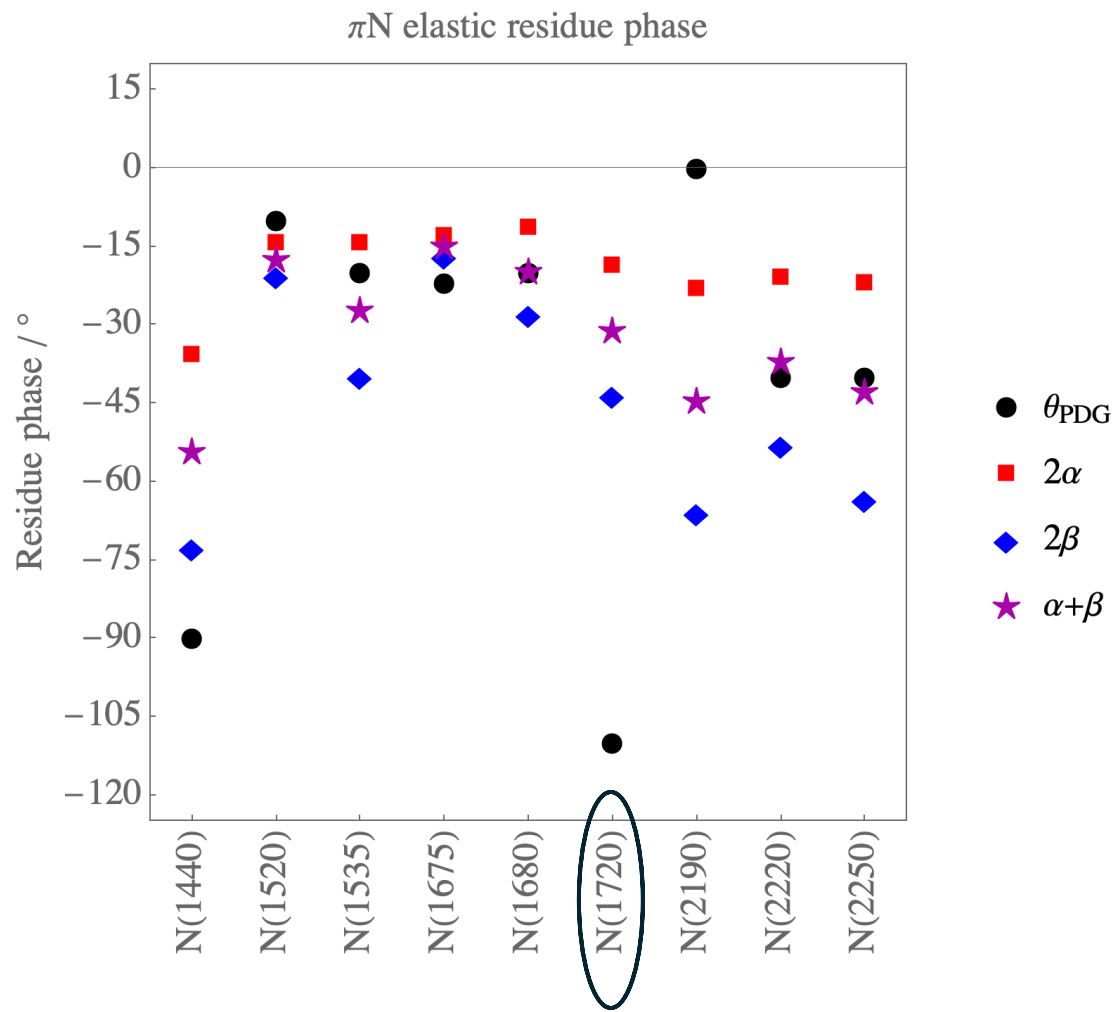


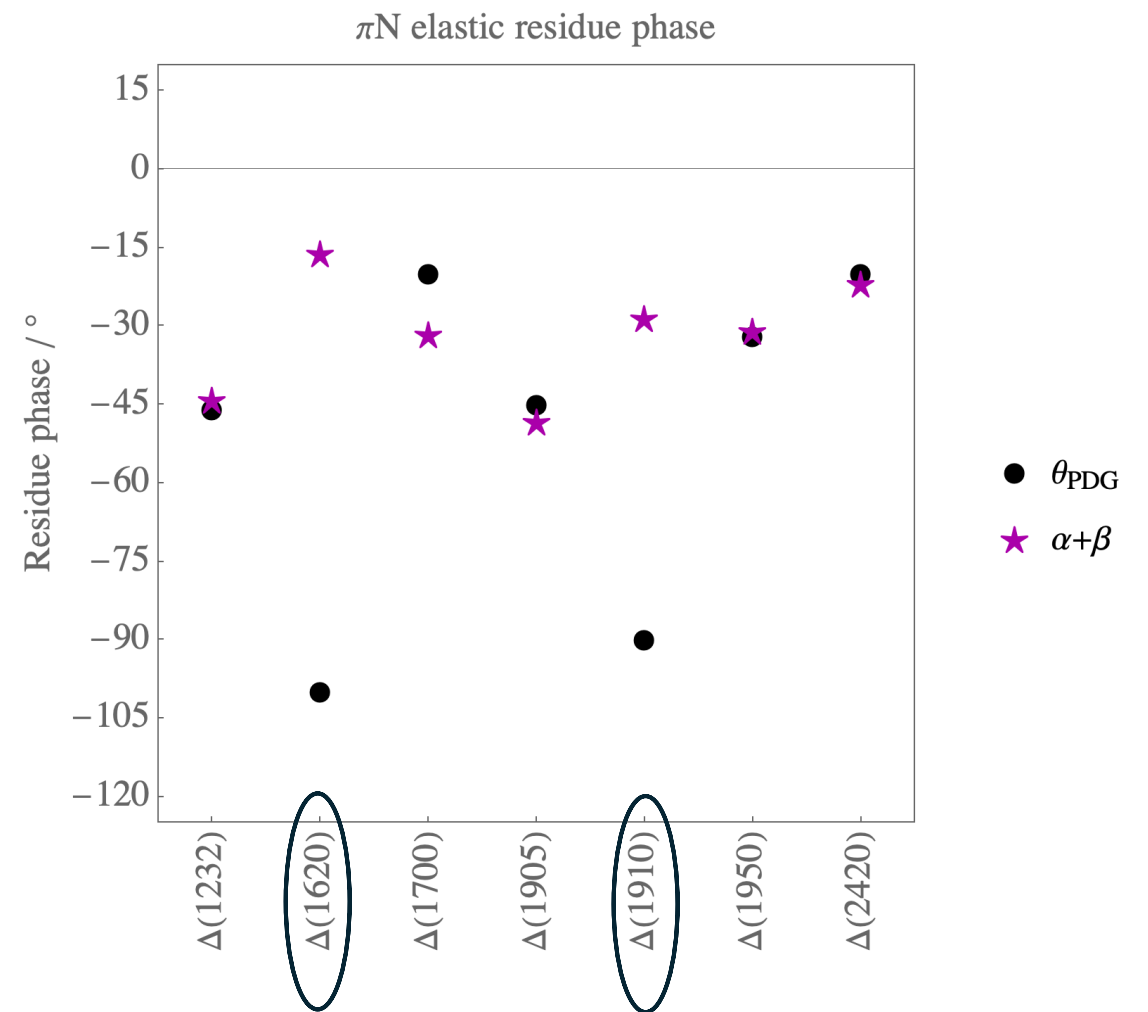
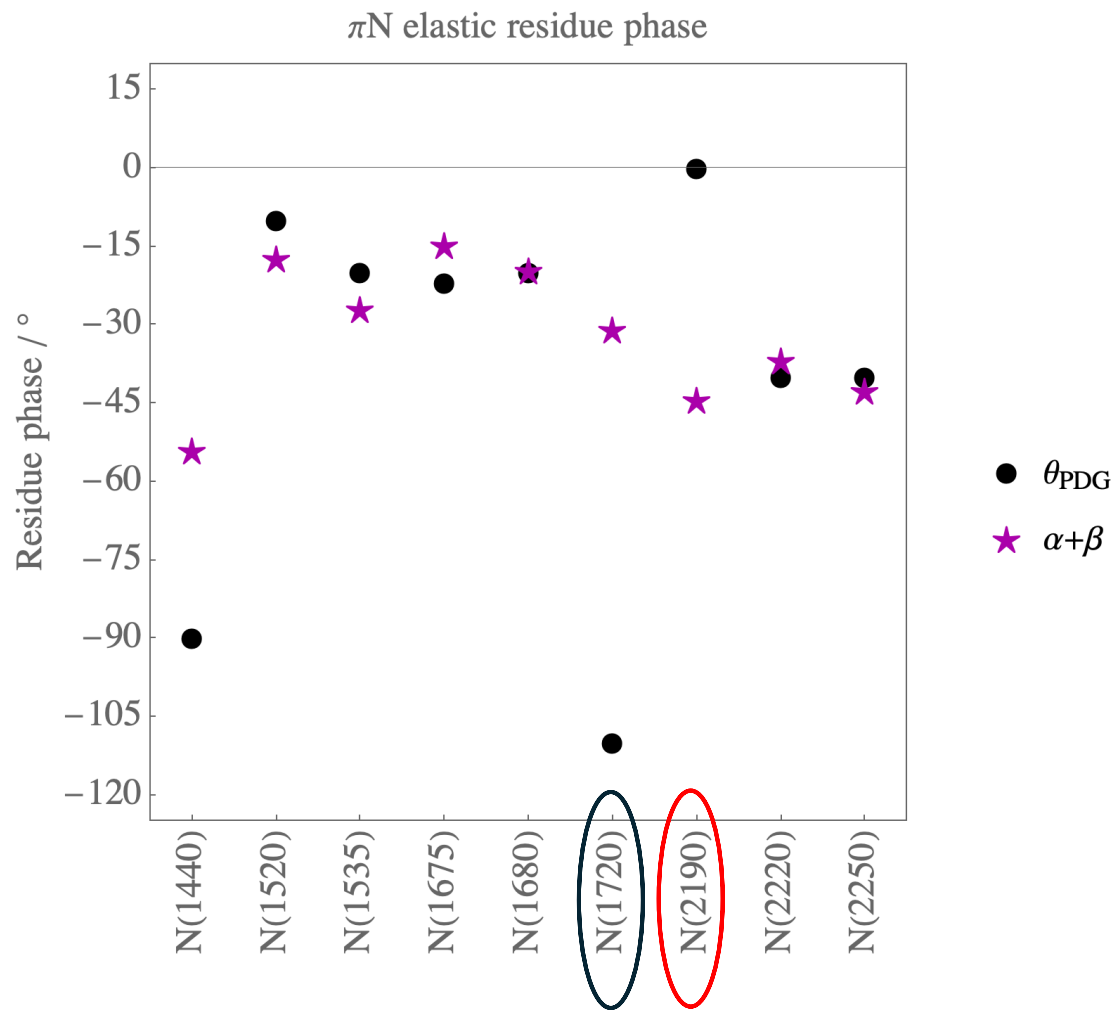


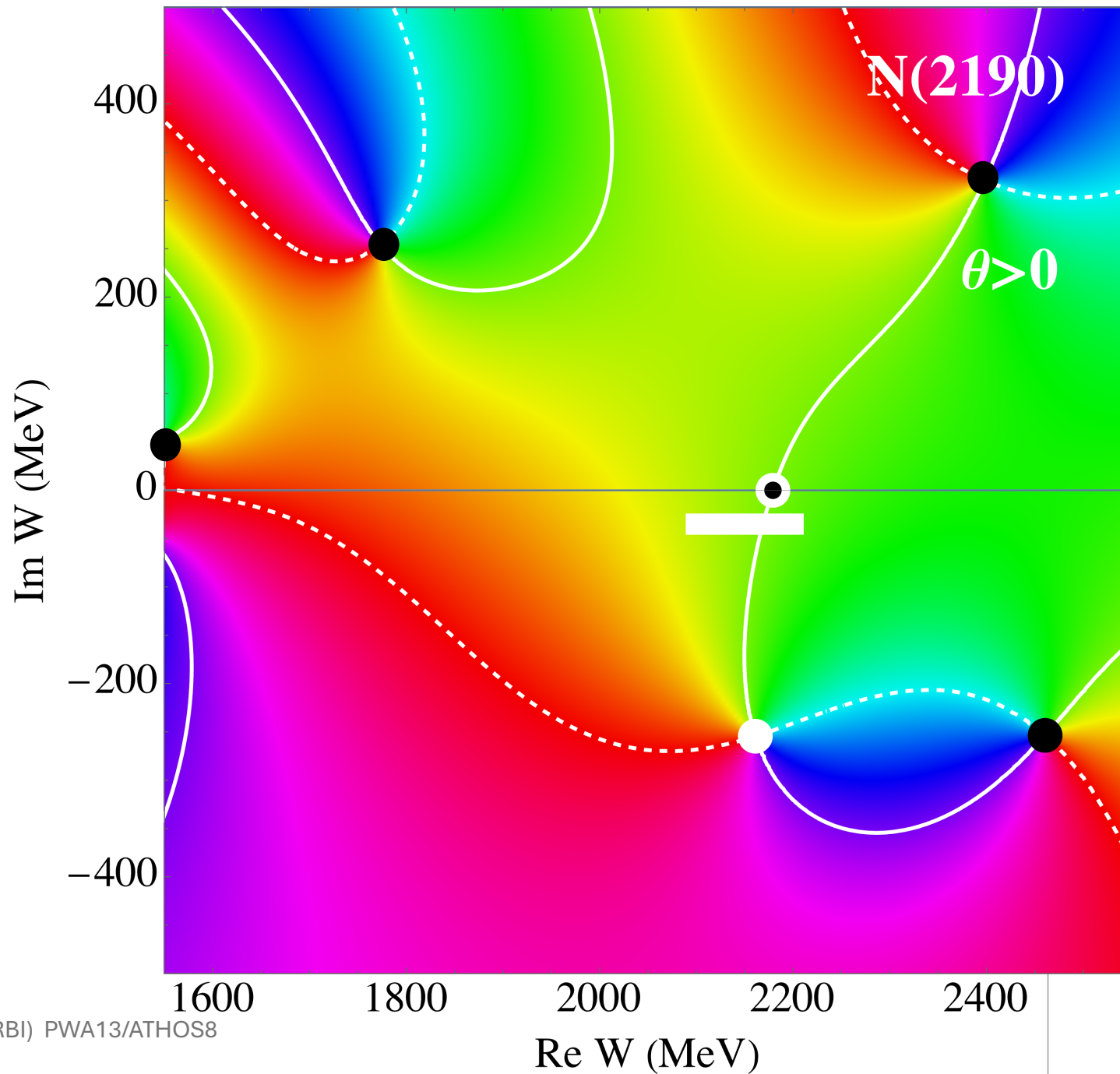


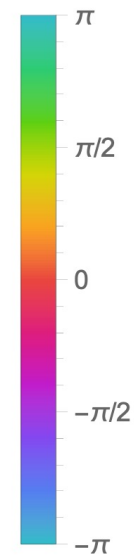
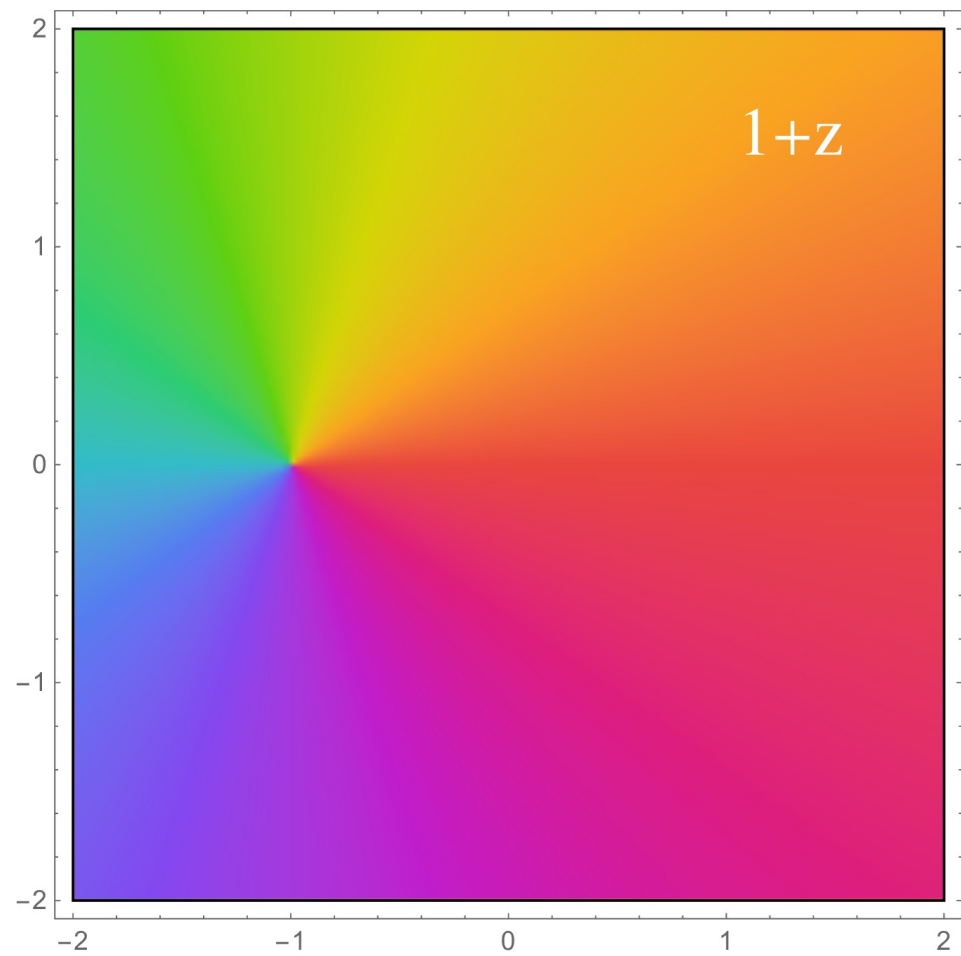
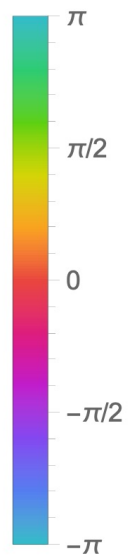
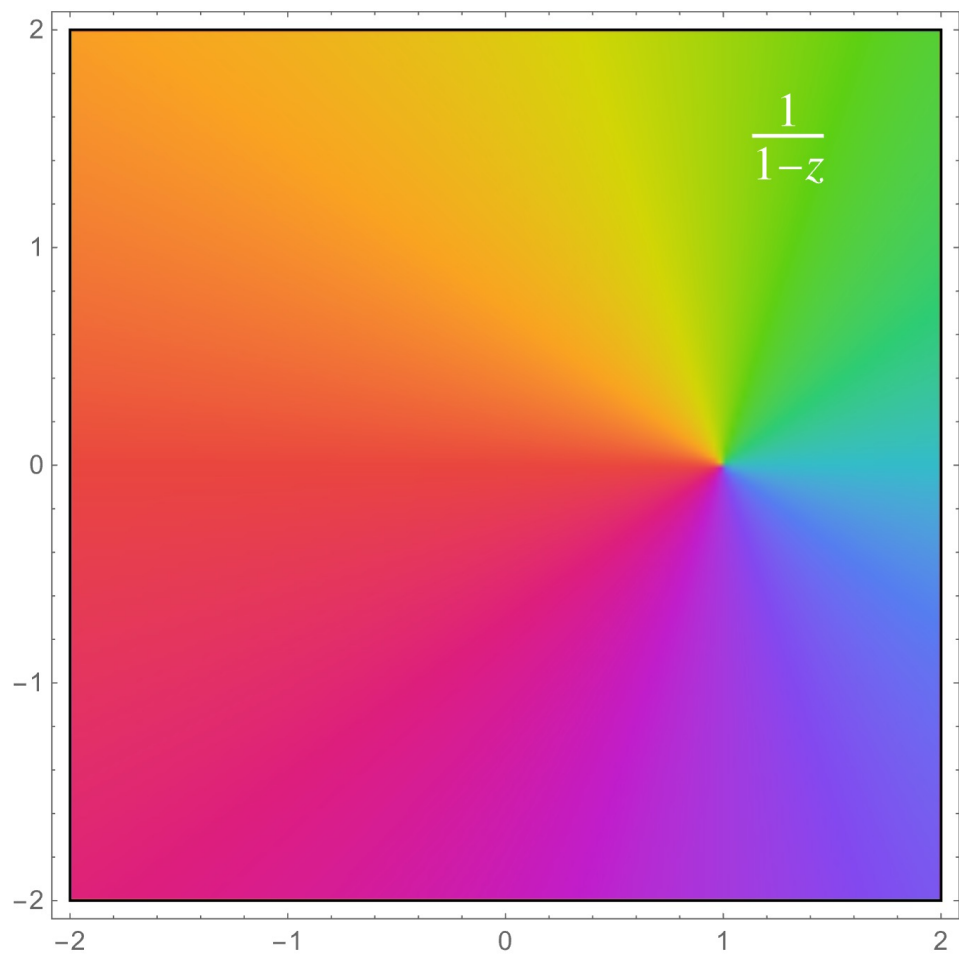


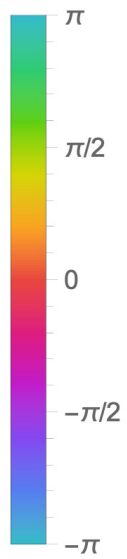
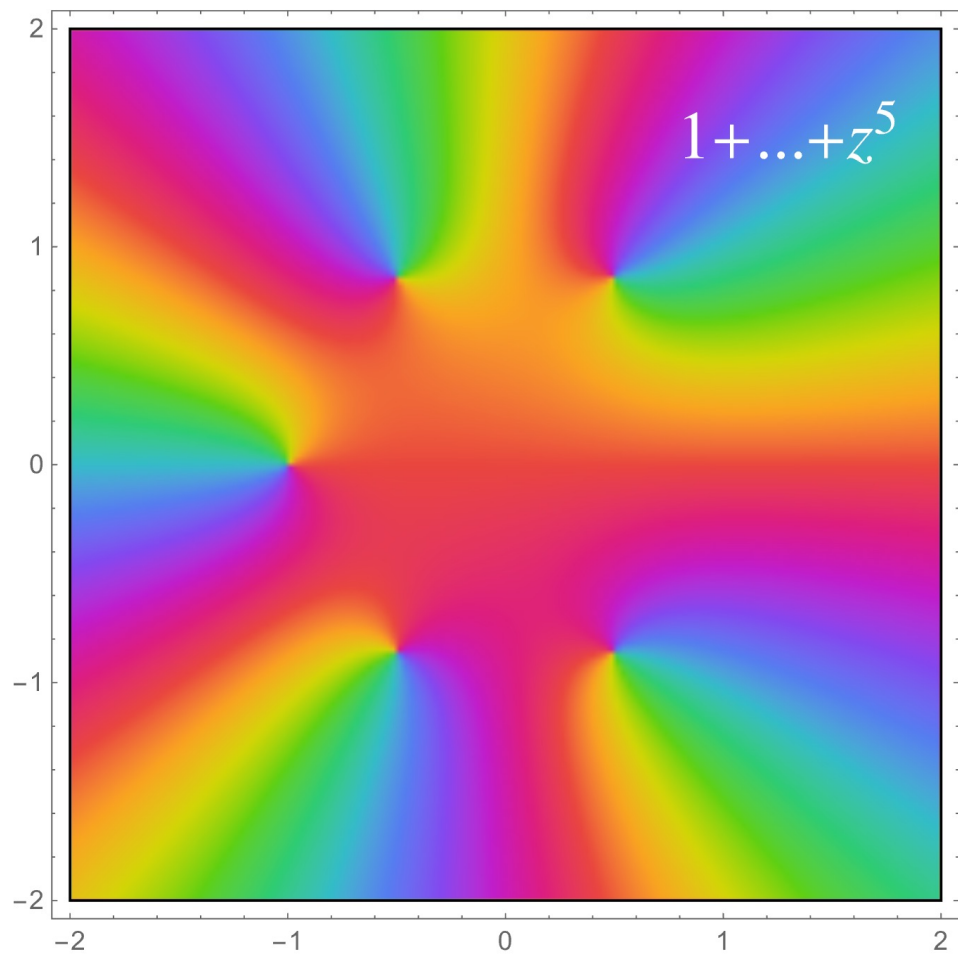
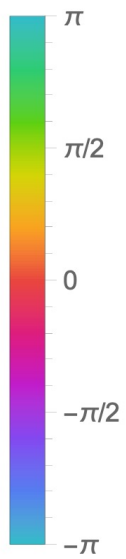
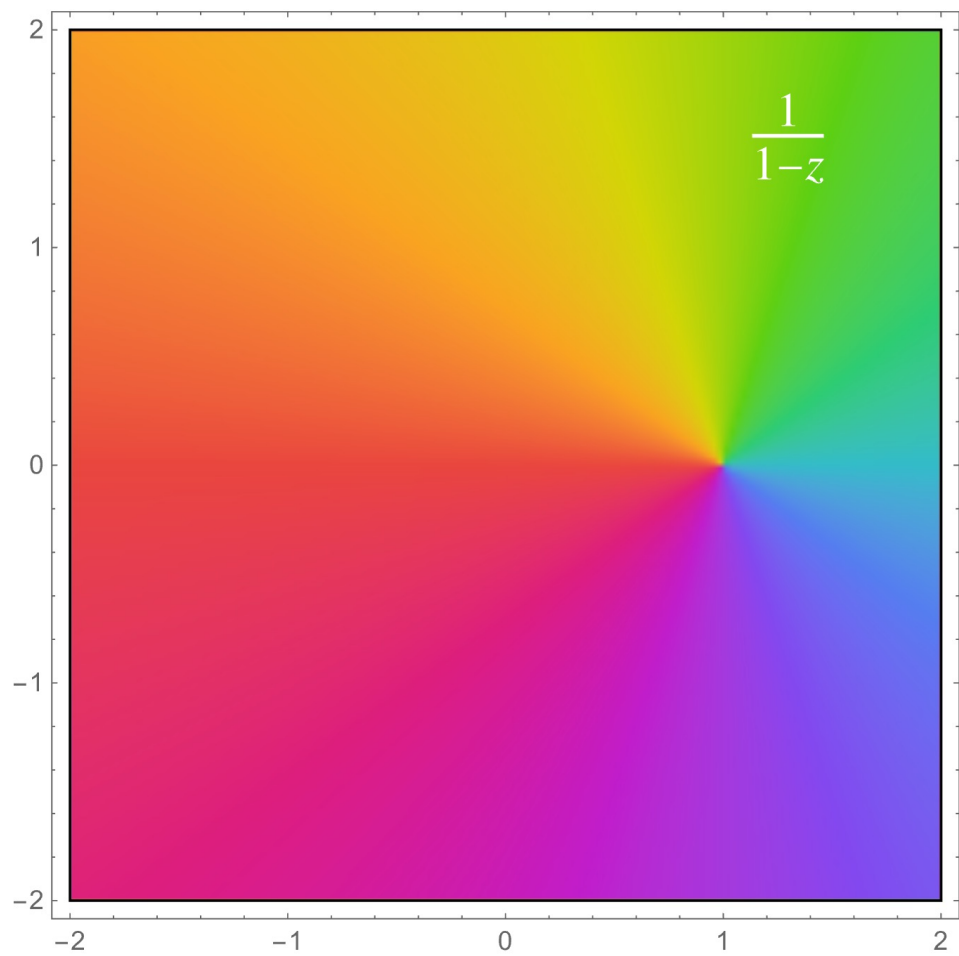


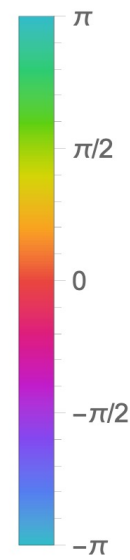
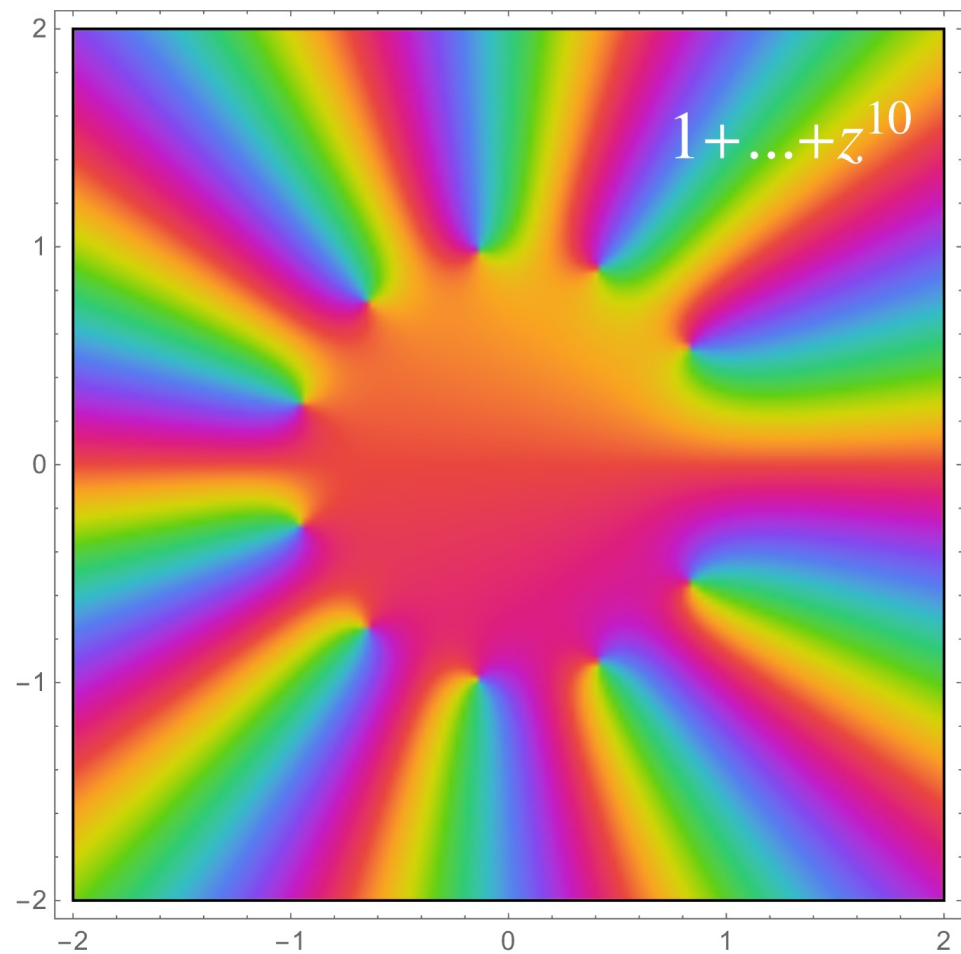
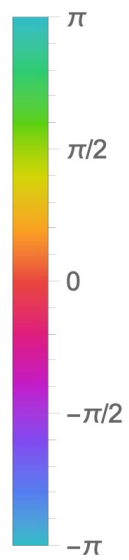
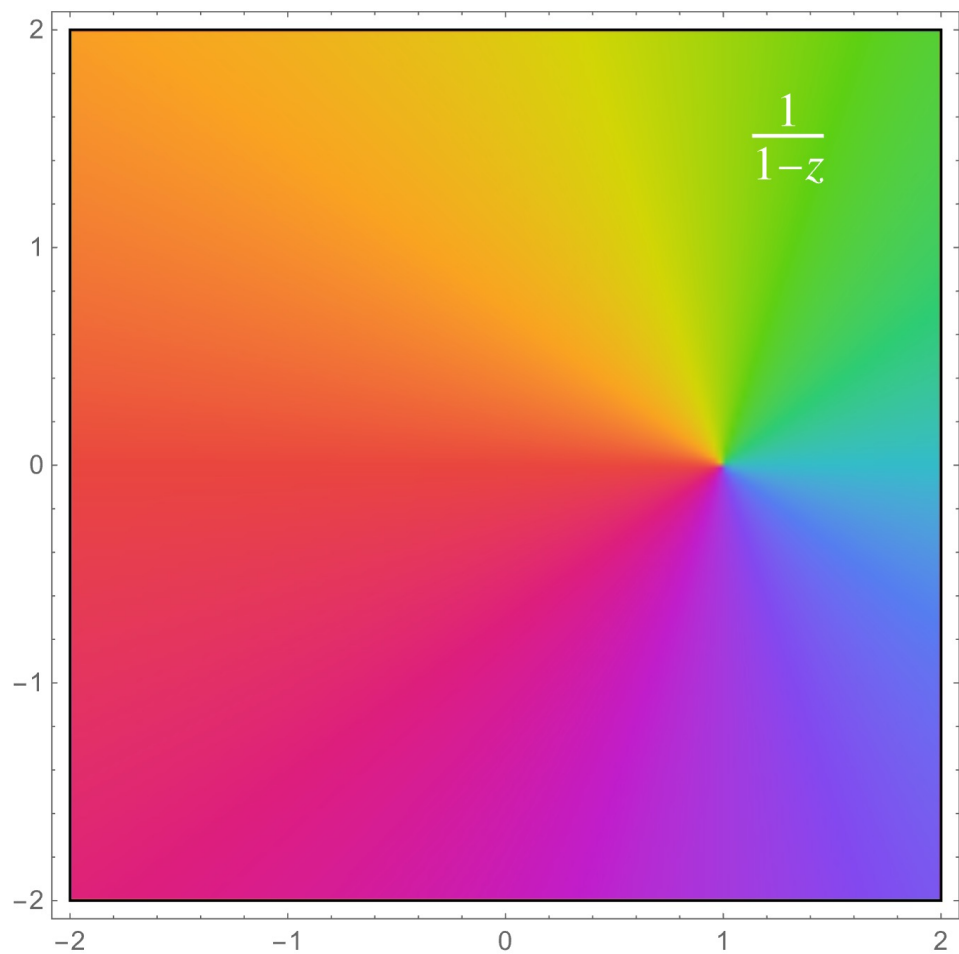


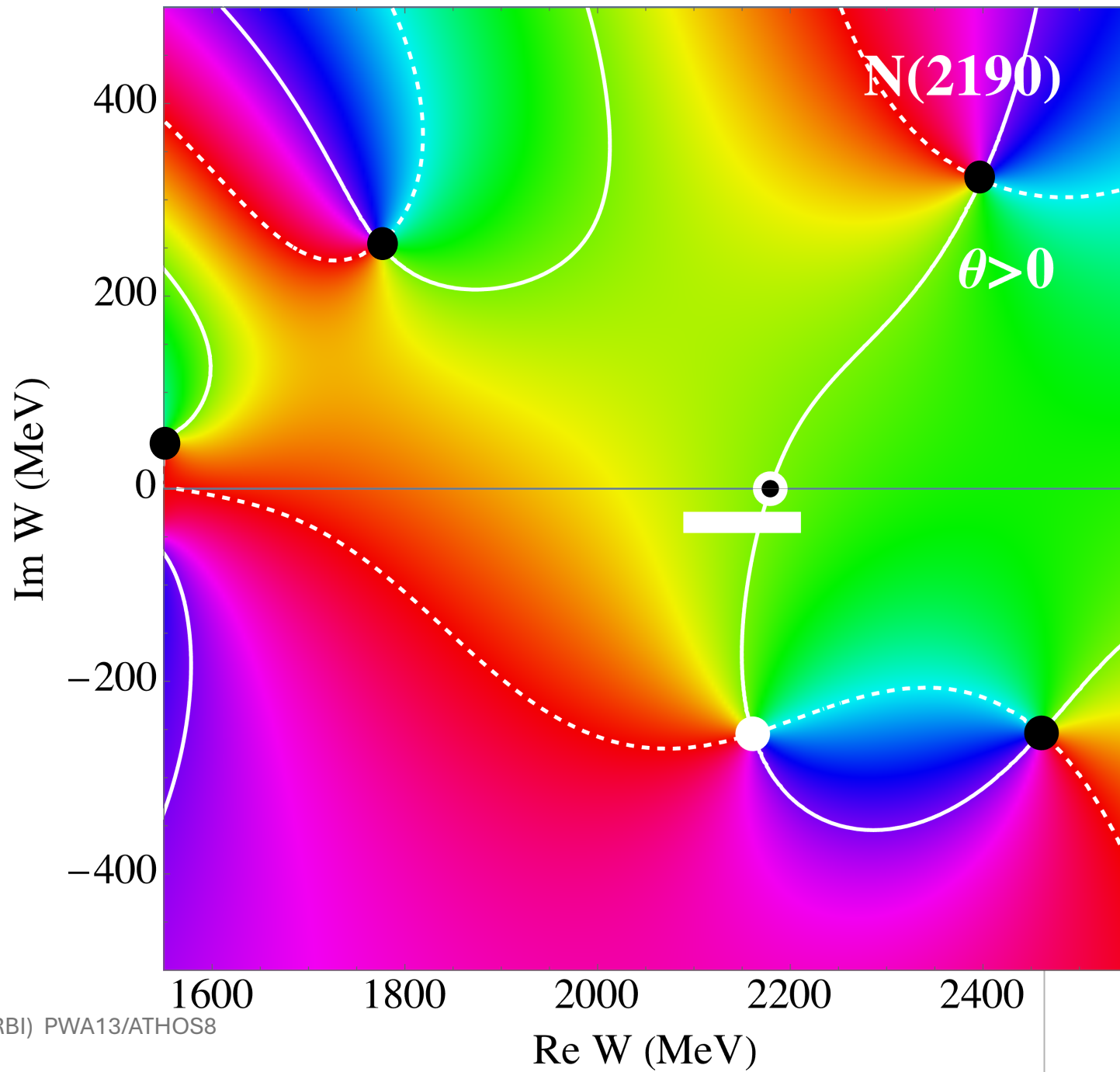


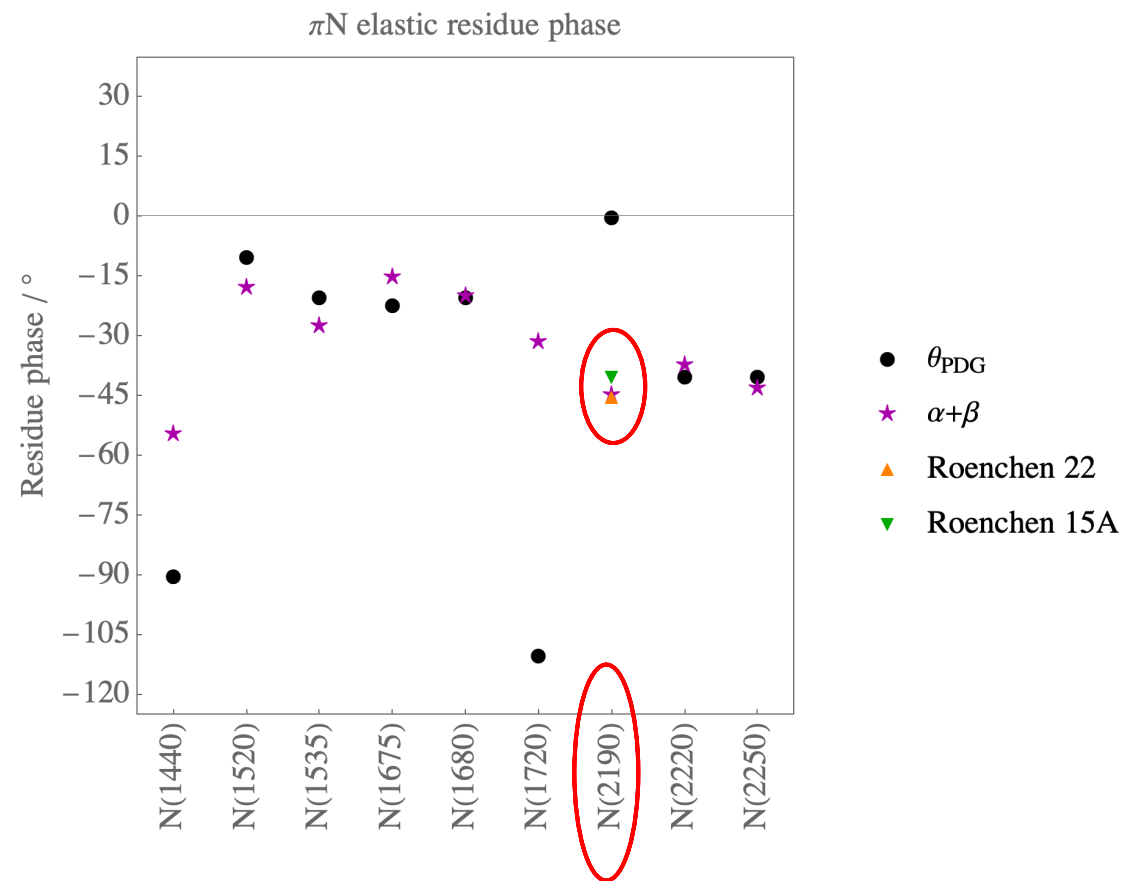
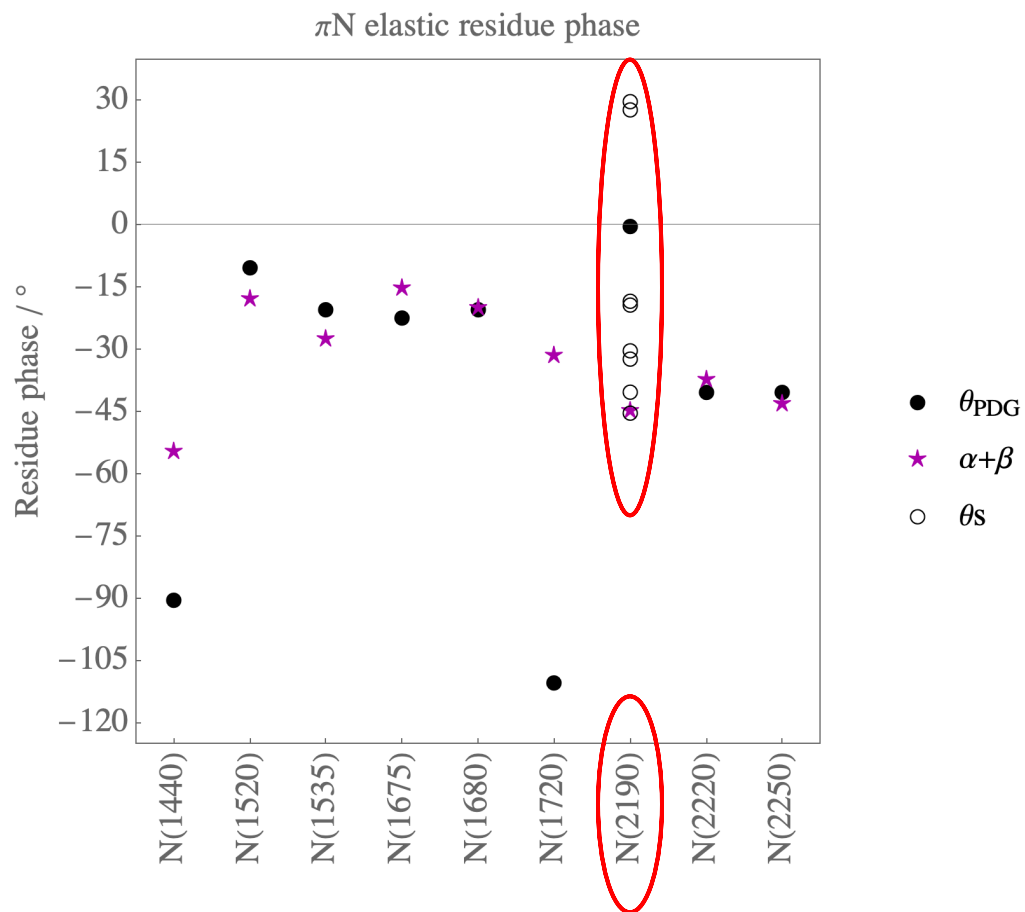






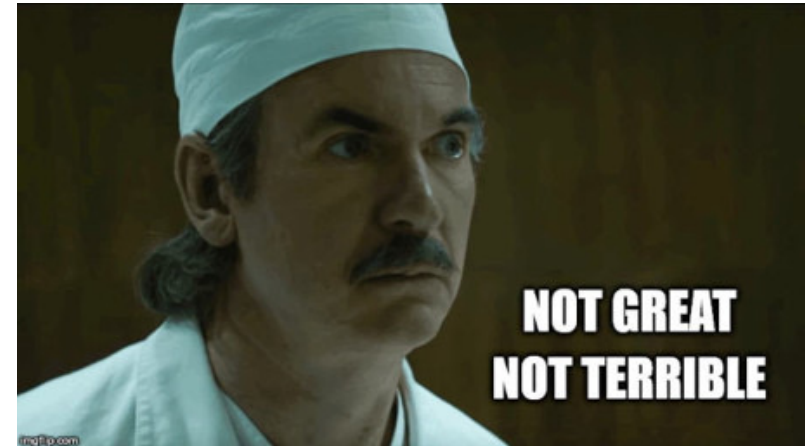
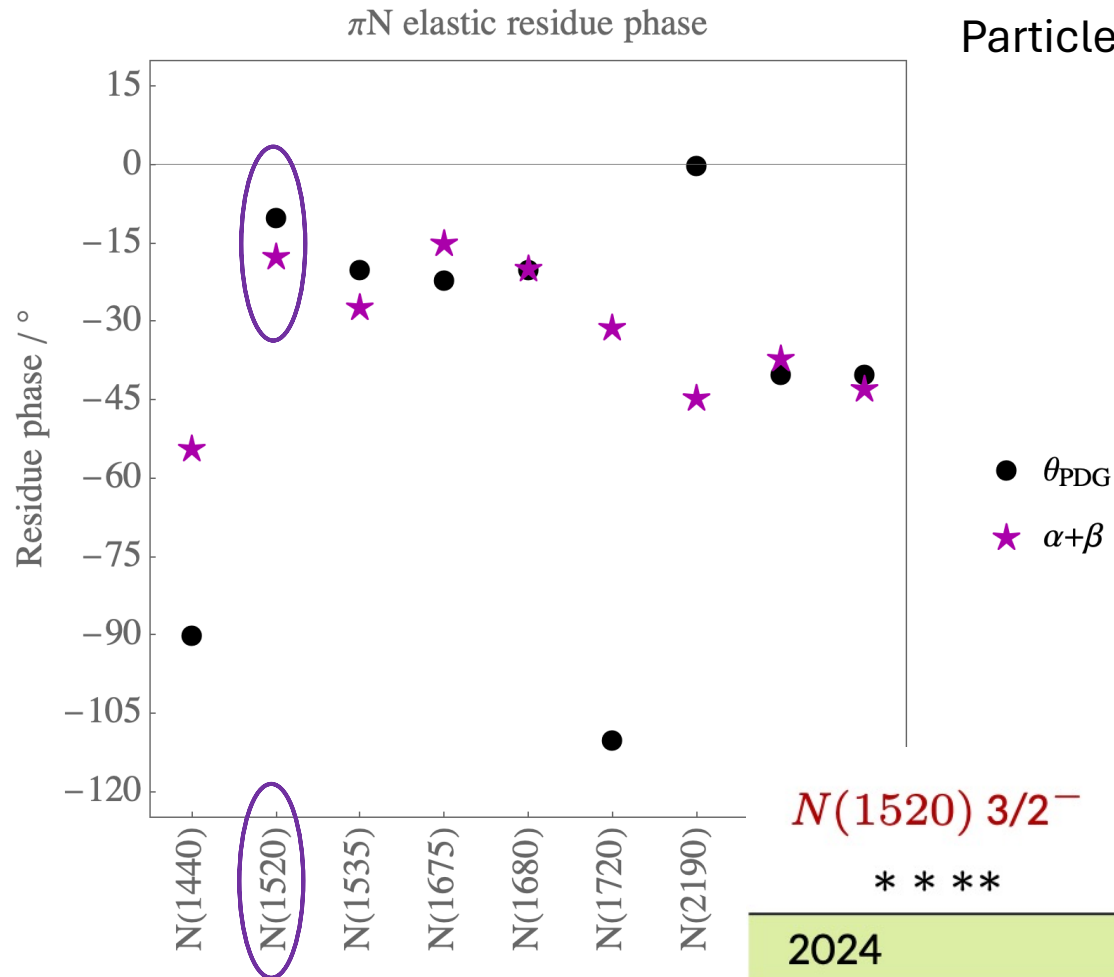






Our (purple) result for N(1520): -17.5 deg

Particle Data Group: from -5 to -15 deg

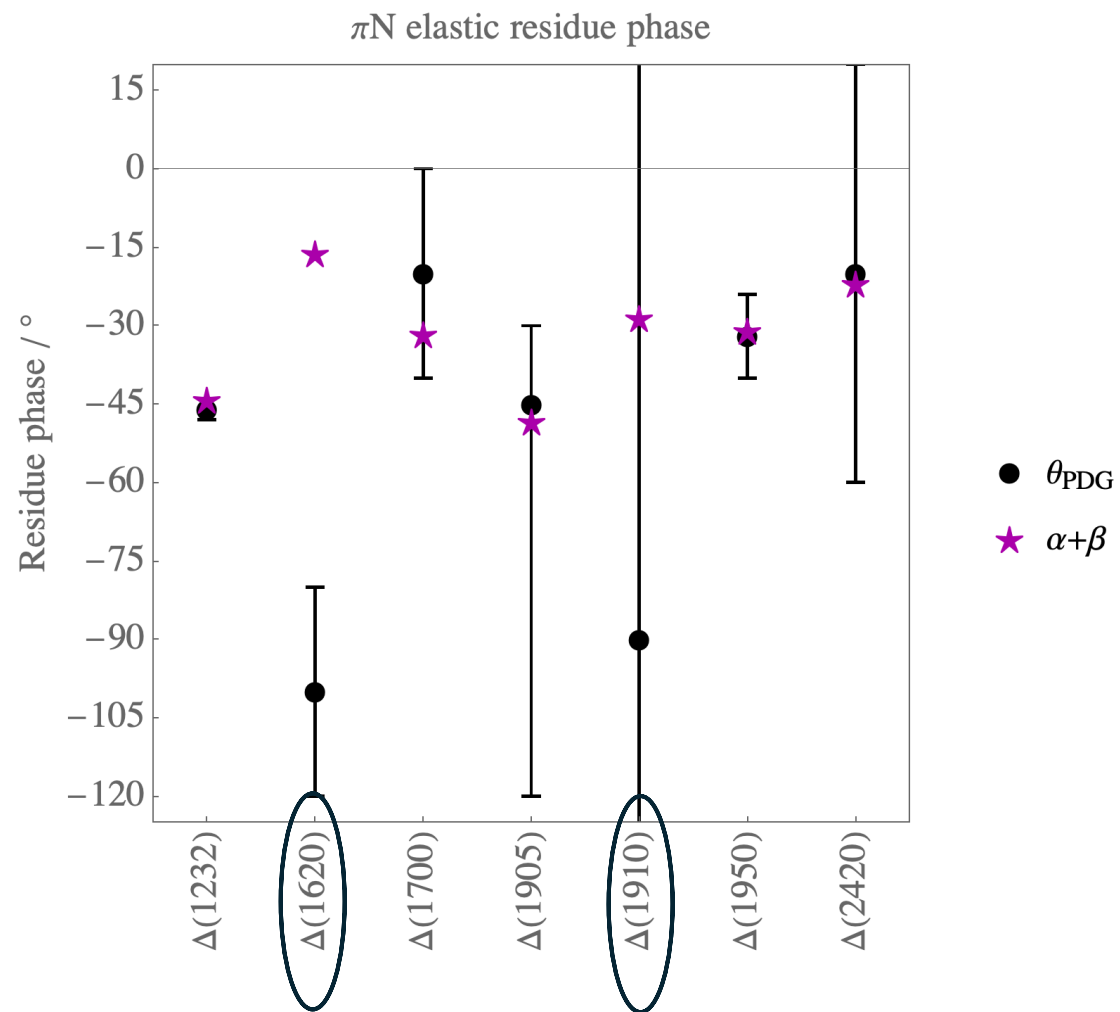
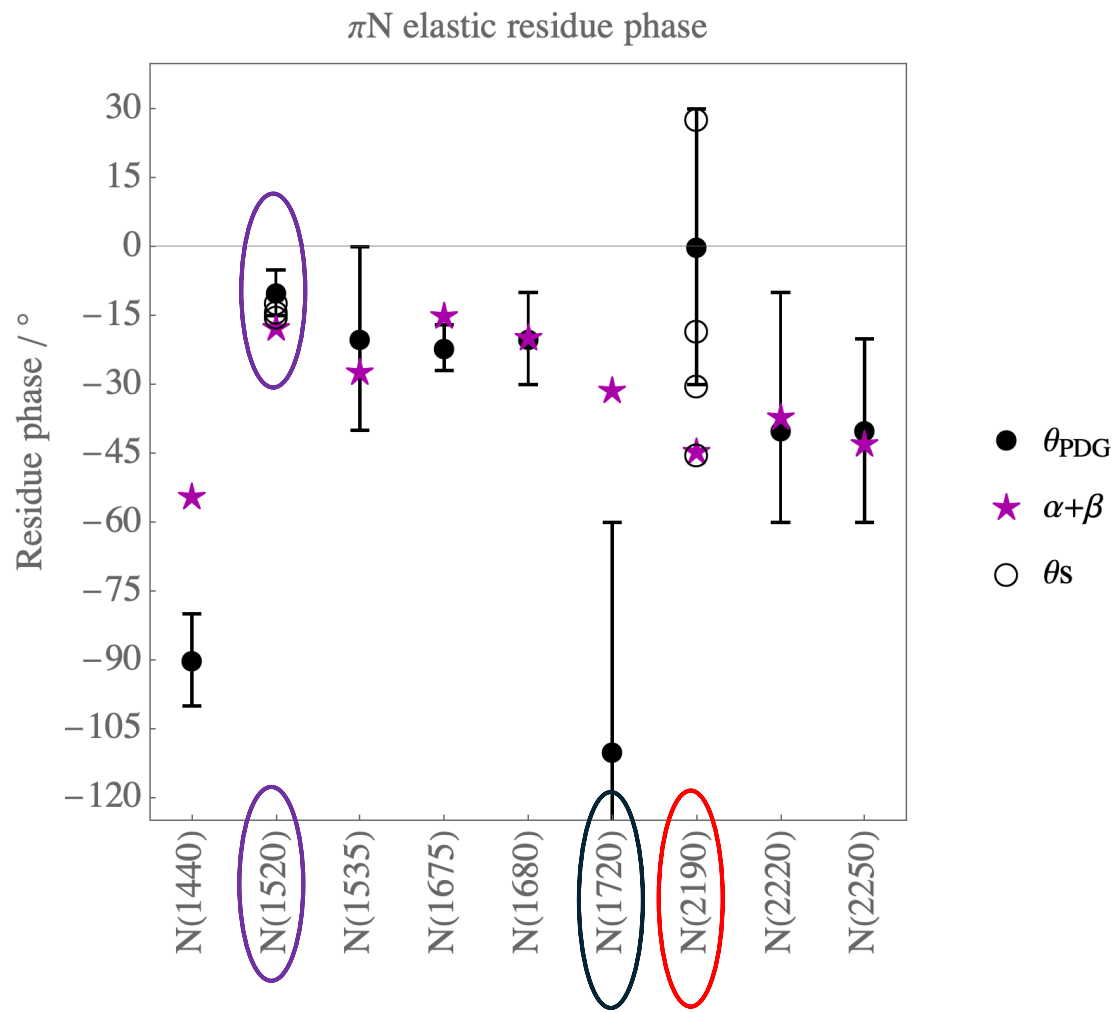


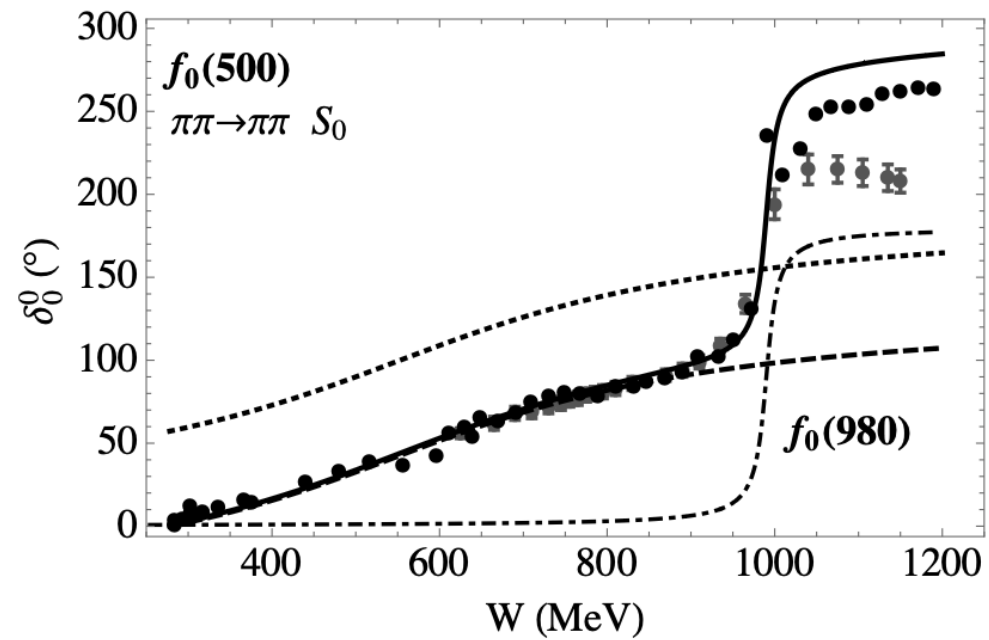
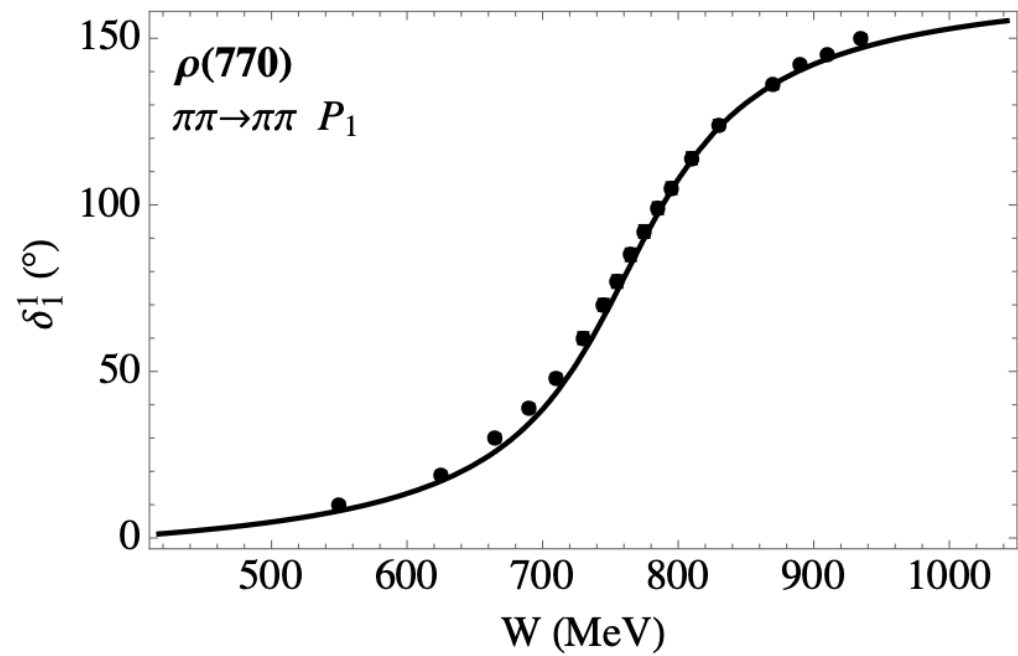
Wednesday morning talk:

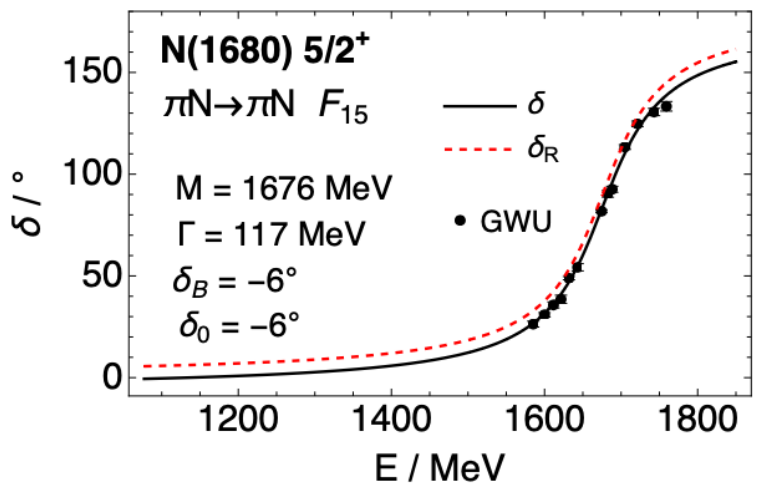
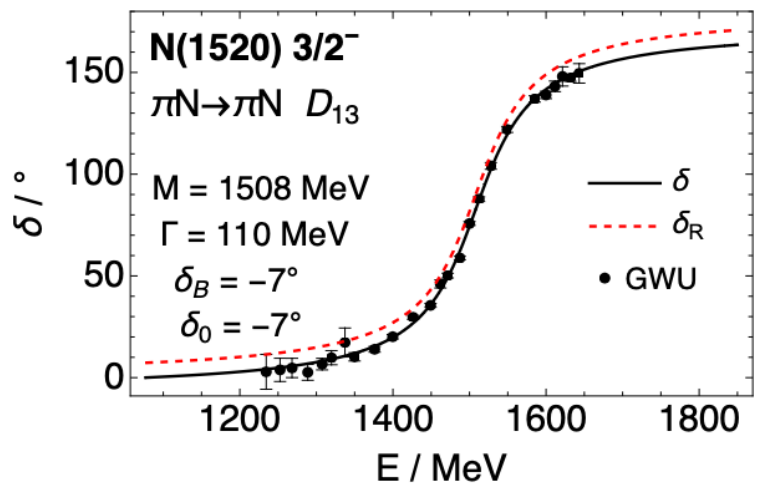
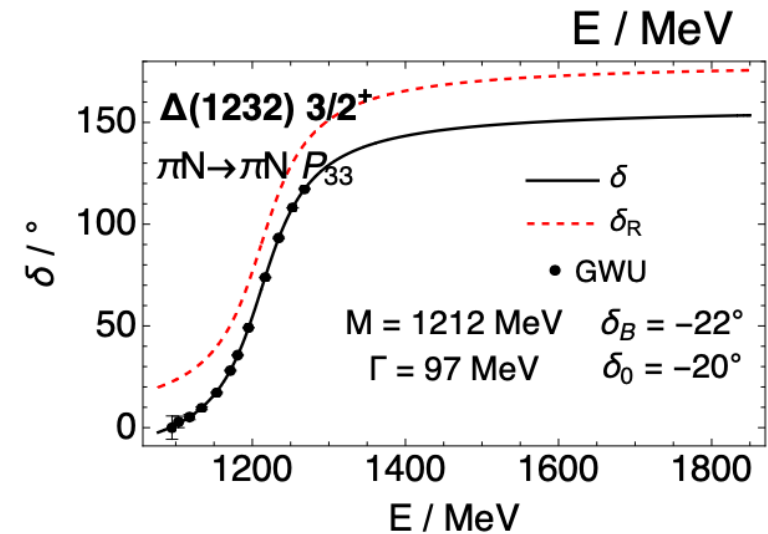
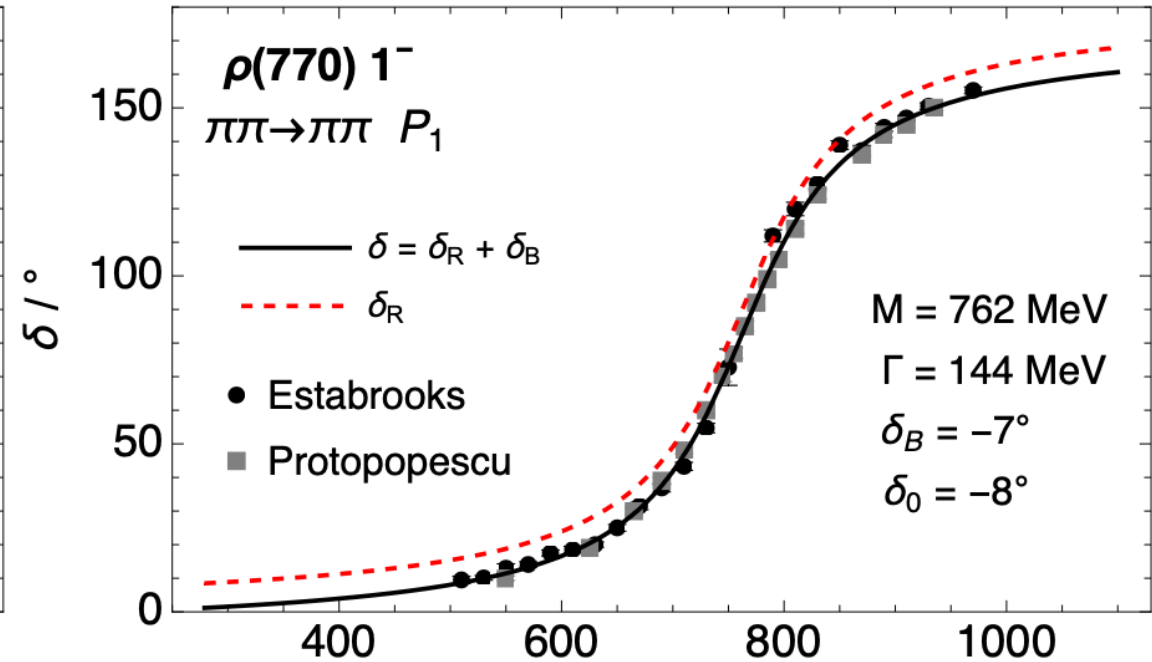
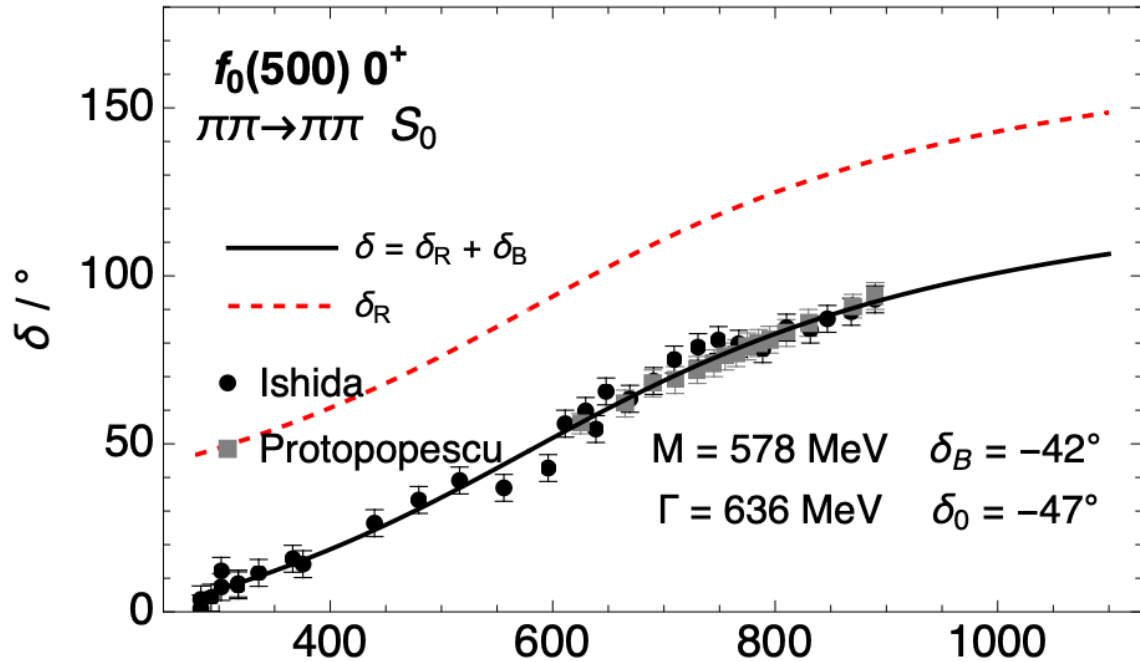
The Jülich-Bonn dynamical coupled-channel approach

Given by: **Christian Schneider**

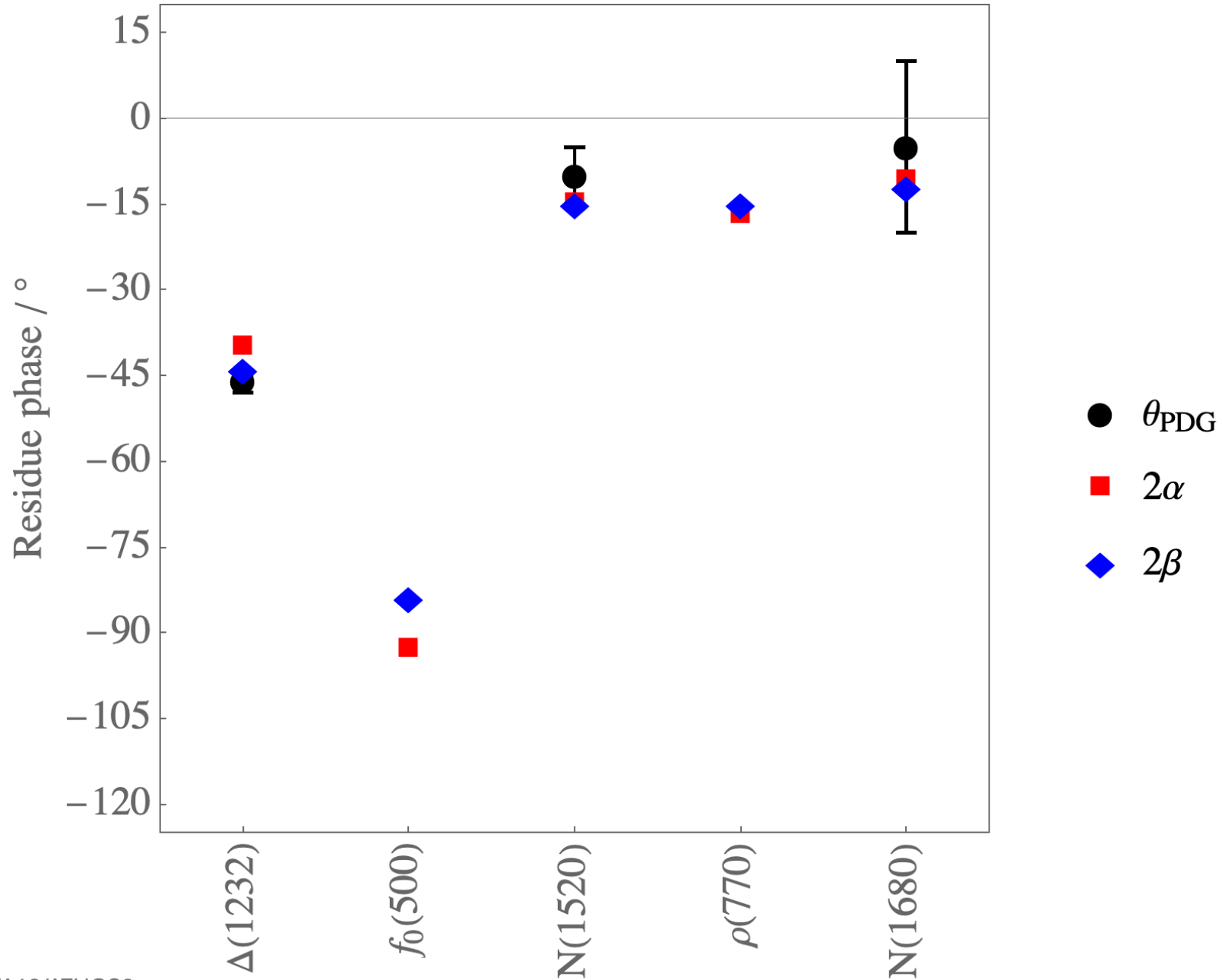
$N(1520) 3/2^-$ * * * *	Re E_0 [MeV]	$-2\text{Im } E_0$ [MeV]	$ r _{\pi N \rightarrow \pi N}$ [MeV]	$\theta_{\pi N \rightarrow \pi N}$ [deg]
2024	1496.3	100.4	24.4	-18.2
2022	1482 ± 6	126 ± 18	27 ± 21	-36 ± 48
PDG 2024	1510 ± 5	112.5 ± 7.5	35 ± 3	-10 ± 5



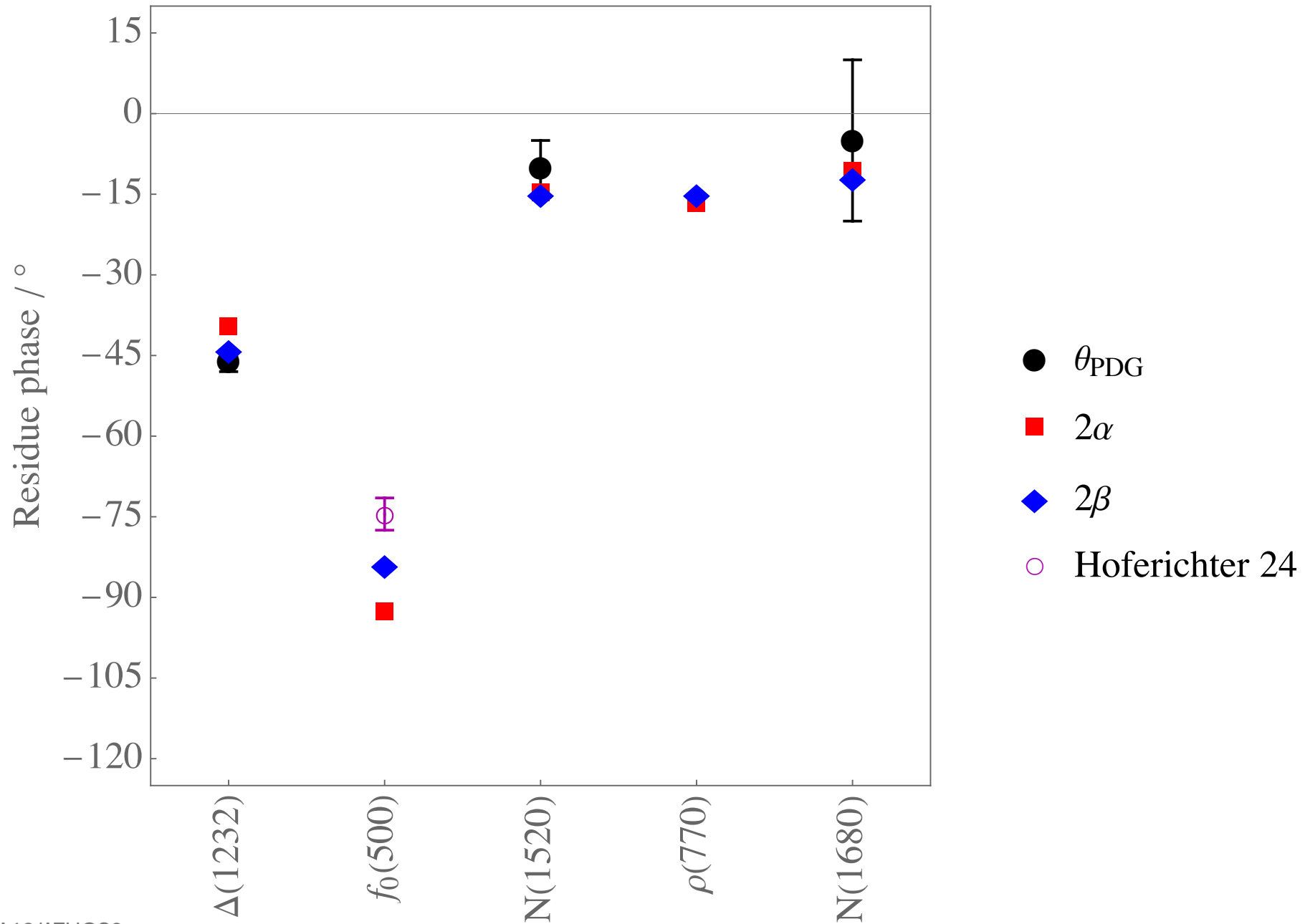


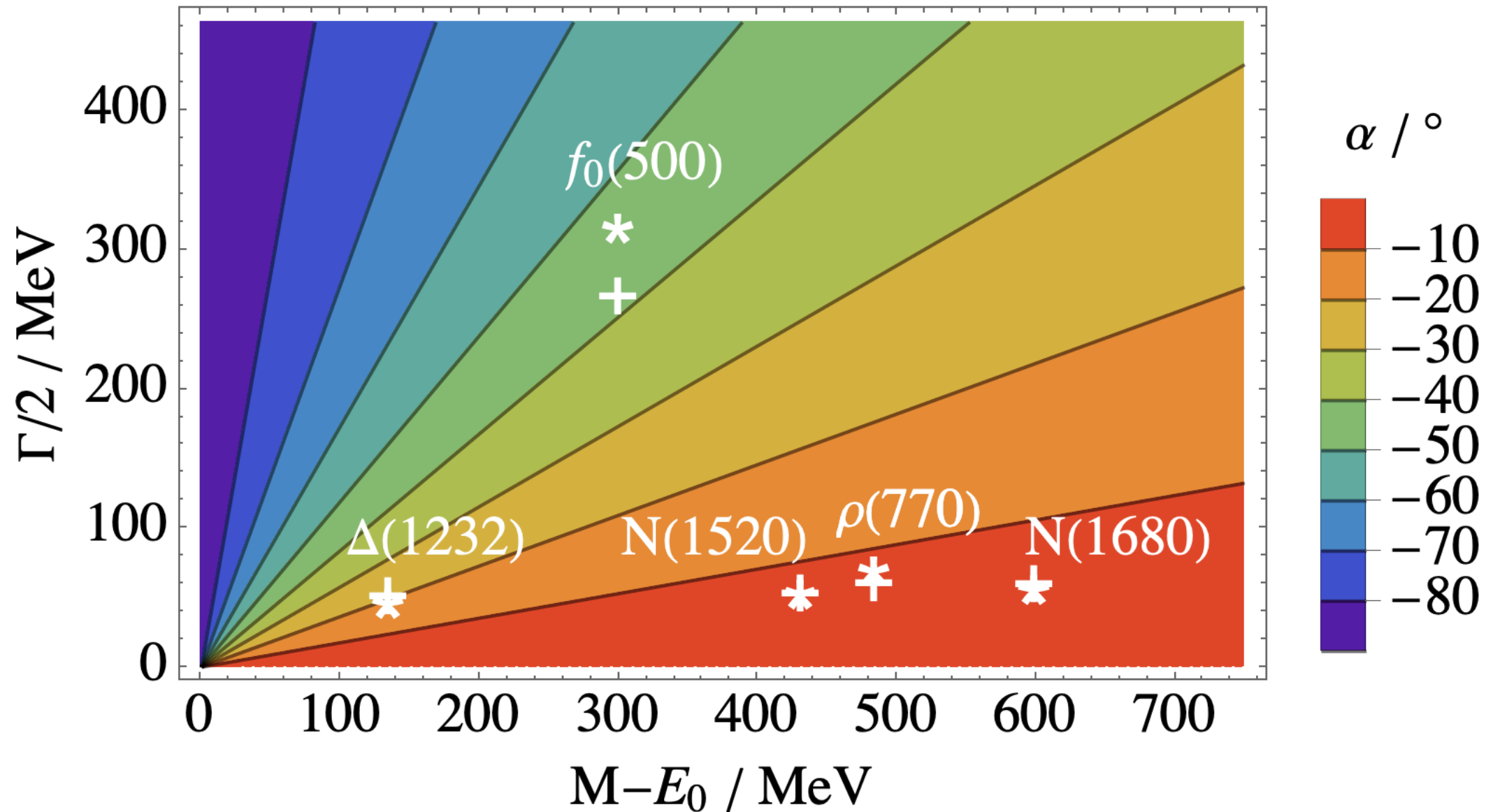


$\pi\pi$ & πN elastic residue phase



$\pi\pi$ & πN elastic residue phase





Summary


- **θ** is a useful parameter and better estimates are needed
- Its relationship with the **threshold (α)** and the **BW mass (β)** is curious
- **Do calculate** T matrix in the complex plane, even far from resonant poles
- **Beware** not only (unnecessary) **poles**, but also **zeros**
- What we call a non-BW resonance can in fact be a **good BW resonance**
- **$f_0(500)$** is strange for a similar reason why **$\Delta(1232)$** is strange
- It is **too close to the threshold** (and too broad)...
- (broadness, by itself, is not a problem, see e.g. the **Z boson**)
- ...but it is well describable by the simplest BW parameterization (**M , Γ , and β**)



Purple phase...
...all in my brain.

**Lately, things just
don't seem the same.**

Thank you 😊

A close-up portrait of Mike E. Sadler, an older man with short, light-colored hair and a slight smile. He is wearing a light blue button-down shirt under a textured, olive-green blazer. The background is dark and out of focus, showing some architectural elements like a doorway or window frame.

**Mike E. Sadler
(1948-2021)
Founding father of
the PWA conference**