# Regge trajectories of mesons from a dispersive connection to pole parameters


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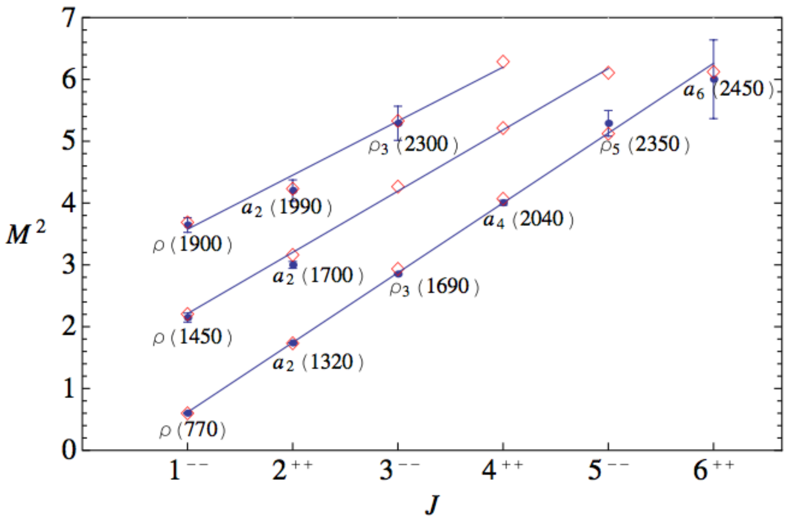
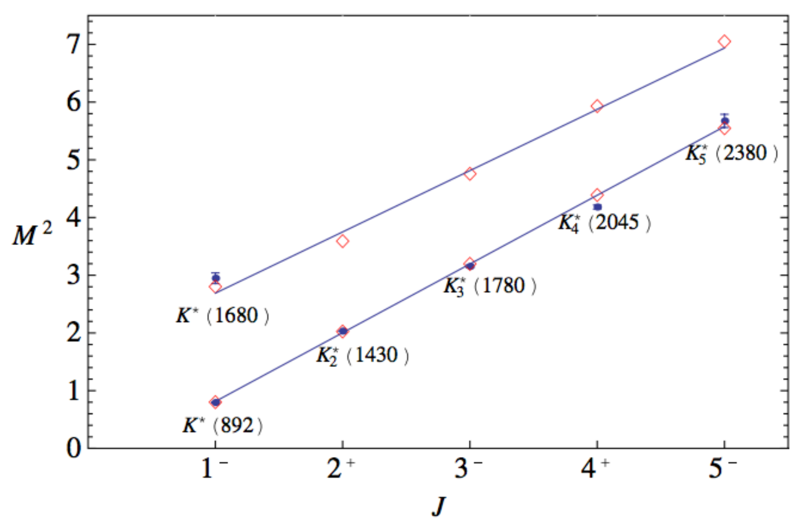
# Motivation

**Regge trajectories**

(spin) vs. (mass)$^2$



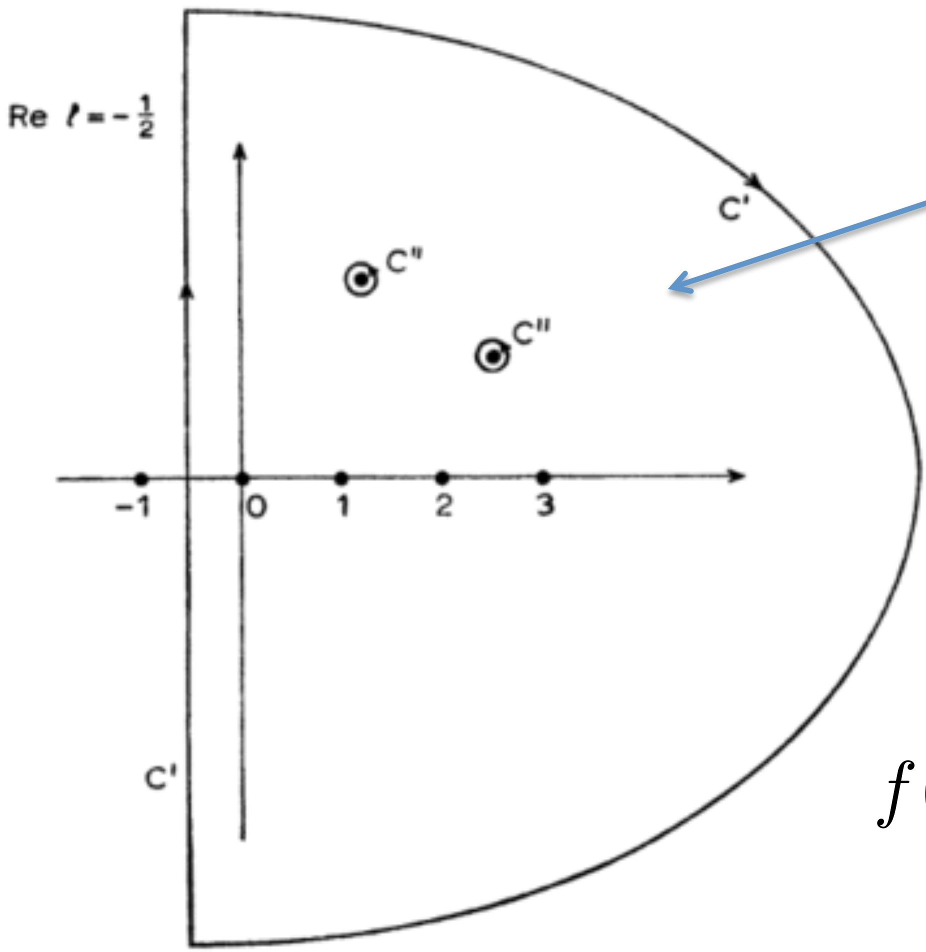

**Linear trajectories** with a **universal slope**

Rotation of the flux tube connecting quark-antiquark

However, the **$f_0$(500)** resonance **do not fit in**

# Regge Theory

**The concept of partial wave can be extended to complex *J***




**Regge poles**

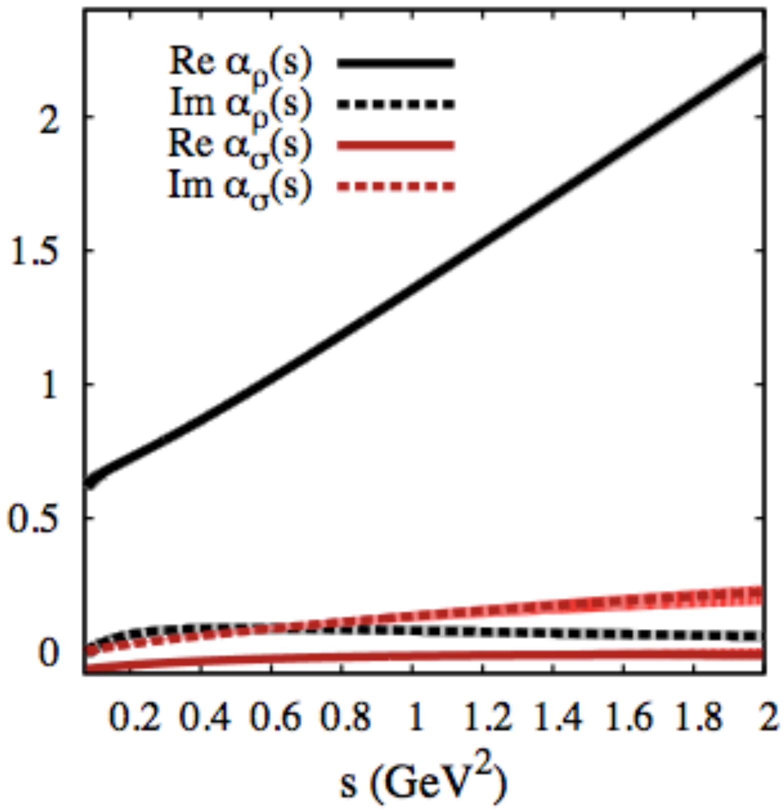
Position $\alpha(s)$

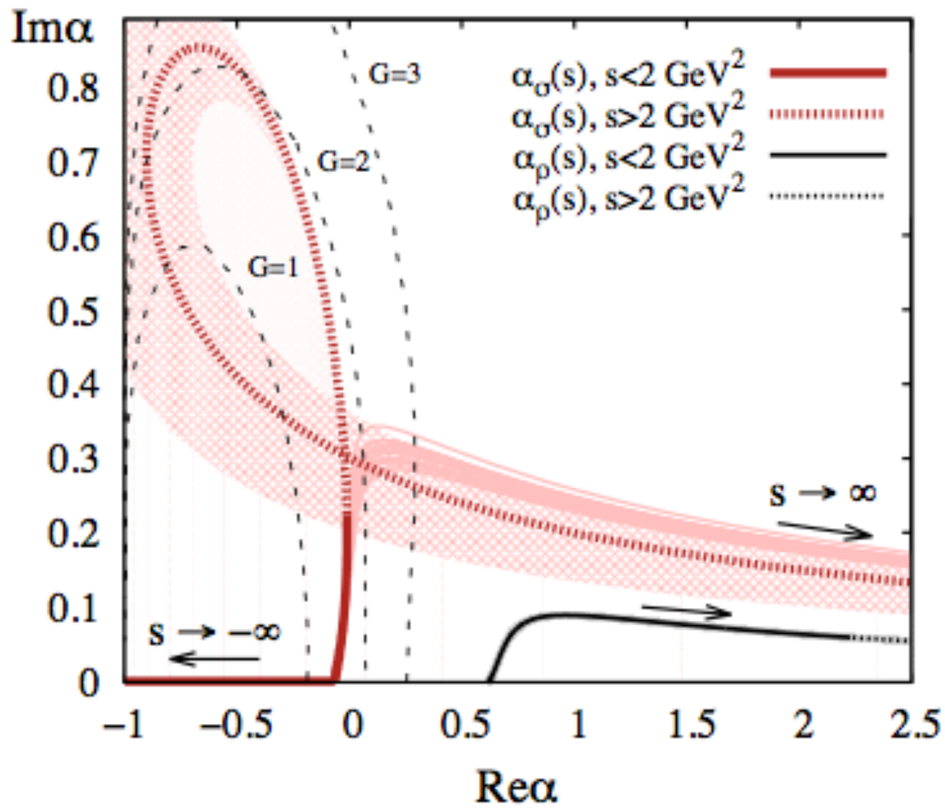
Residue $\beta(s)$

**Regge Trajectory**

$$f(J,s) = \hat{f} + \frac{\beta(s)}{J-\alpha(s)}$$

# Results for ρ(770) and $f_0(500)$



# Thank you!

Please come and have a look at the poster!!

# Parametrization of the amplitudes

- Unitarity condition on the real axis implies

$$\mathrm{Im}\ \alpha(s) = \rho(s)\beta(s)$$

- Properties of β*(s)*

$$\beta(s) = \frac{\hat{s}^{\alpha(s)}}{\Gamma(\alpha(s) + \frac{3}{2})}\gamma(s)$$

**Dispersion relations:**

$$\begin{aligned}
\mathrm{Re}\alpha(s) &= \alpha_0 + \alpha' s + \frac{s}{\pi} PV \int_{4m_\pi^2}^{\infty} ds' \frac{\mathrm{Im}\alpha(s')}{s'(s'-s)}, \\
\mathrm{Im}\alpha(s) &= \rho(s) b_0 \frac{\hat{s}^{\alpha_0 + \alpha' s}}{|\Gamma(\alpha(s) + \frac{3}{2})|} \exp\left(-\alpha' s[1 - \log(\alpha' \tilde{s})]\right. \\
&+ \left. \frac{s}{\pi} PV \int_{4m_\pi^2}^{\infty} ds' \frac{\mathrm{Im}\alpha(s') \log\frac{\hat{s}}{\hat{s}'} + \arg\Gamma\left(\alpha(s') + \frac{3}{2}\right)}{s'(s'-s)}\right)
\end{aligned}$$