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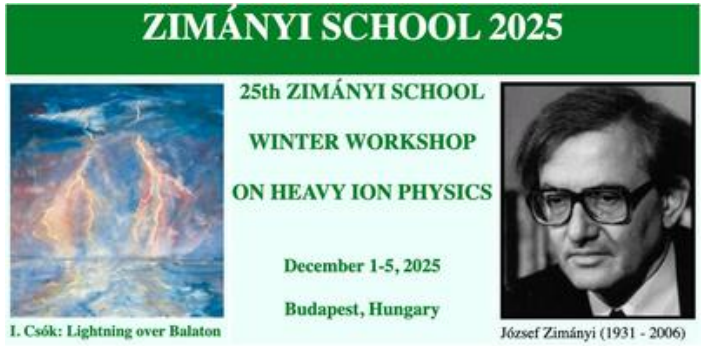

Quantum corrections in quark-meson model under rotation

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Quantum corrections in quark-meson model under rotation

Non-centrality in heavy ion collisions induces angular momentum $\rightarrow$ production of rotating quark gluon plasma

Chiral symmetry $\rightarrow$ phase depends of temperature, chemical potential and (**angular**)**velocity**

Sigma meson expectation value as an order parameter obtained from the LSM_q model

Equation of motion for a slowly varying meson field

$$\lambda(\sigma^2 + \vec{\pi}^2 - v^2)\sigma = h - g\langle\bar{\psi}\psi\rangle \tag{1}$$

Solution for the condensate can be found as [V.E. Ambruș, JHEP 08 (2020) 016]

$$\langle\overline{\psi}\psi\rangle = \frac{MN_cN_f}{8\pi^2}\sum_{\lambda}\sum_{\sigma=\pm1}\sum_{m=-\infty}^{\infty}\int_M^{\infty} dEE\int_{-p}^{p} dk\frac{1}{1+e^{\beta_0(\tilde{E}-\sigma\mu_0)}}J_m^+(q\rho),$$

$$\tilde{E} = E - \Omega m, \quad J_m^+ = J^2_{m-\frac{1}{2}} + J^2_{m+\frac{1}{2}} \tag{2}$$

Solution of mass-gap equation

We express the condensate in terms of classical contribution [S. Morales-Tejera, V. E. Ambruș, M. Chernodub, arXiv:2502.19087 (2025)] and corrections as

$$\langle\overline{\psi}\psi\rangle = \sum_{n=0}^{\infty}(\hbar\Omega)^{2n}\langle\overline{\psi}\psi\rangle^{(2n)} = \langle\overline{\psi}\psi\rangle^{\mathrm{TE.}} + (\hbar\Omega)^2\langle\overline{\psi}\psi\rangle^{(2)} + \dots \quad (3)$$

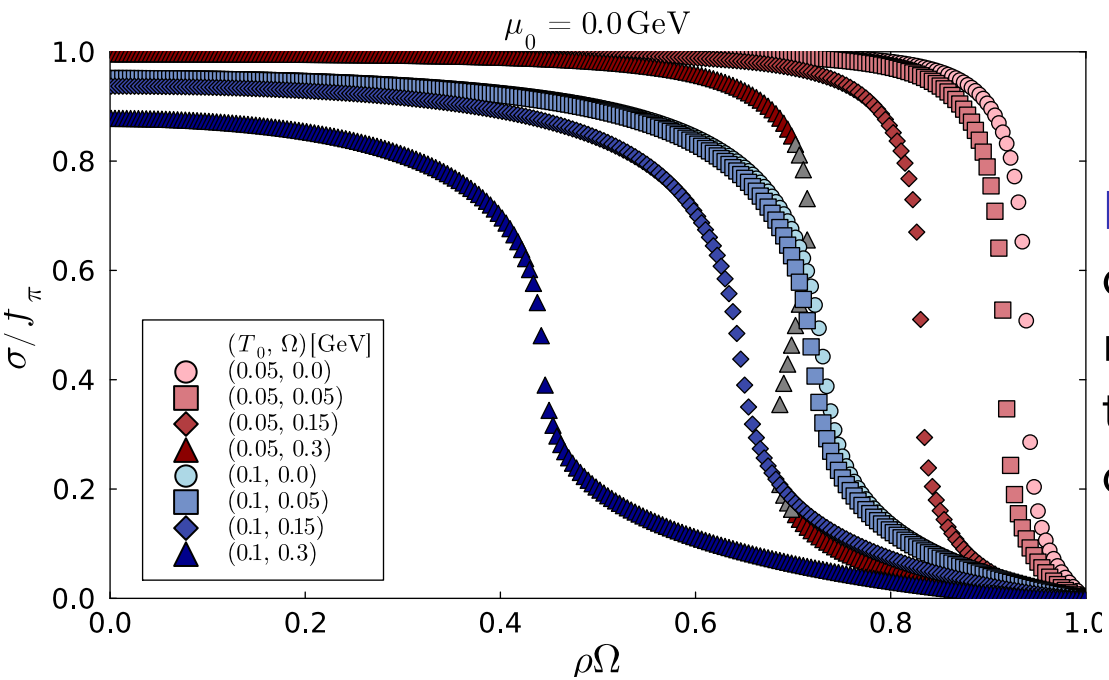

Figure: Normalized σ condensate value in respect to distance from the axis for n=1 correction