Conclusions and speculations in QFT

1) the presence of Monopoles changes the definition of angular momentum operator in QM (and the same is true in QFT) due to 'Spherical symmetry up to internal rotations'

2) In scattering problems from monopoles and short range potentials this introduces a fixed branch cut in complex angular momentum plane on the real axis which touches the poles needed for the S-W-R formula (this effect is 'kinematical' in nature and it will also happen in QFT since also in QFT with monopoles the angular momentum operator gets extra contributions from the internal symmetry generators)

3) to in the Regge formula, the B. I.
3) Consequently, in the Regge formula, the B.I. integral is not anymore negligible with respect to the contributions from Regge poles. This is especially true for small $t$ where the effects of 'raising trajectories' are not felt.

**QFT speculations**

Although one could say 'QM scattering with Dirac monopoles and short range potential is a toy model,' the importance of Regge results for the future developments suggests to take this toy model seriously.

*) Non-Abelian monopoles exist in YM/QCD and for large $r$ they look like Dirac monopoles.

**) Electroweak (Cho-Maison) monopole is being analyzed experimentally in the MOEDAL experiment.
analyzed experimentally in the MOEDAL experiment. Regge-Grībov approach with defects could help in finding a peculiar experimental finger-print of the monopole.

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Nice problem: to prove a Grībov-Froissart formula with monopoles which could be something like

\[
A_r(s,t) = A_{(0)} + \frac{1}{4i} \int_{\frac{1}{2}}^{\frac{1}{2}} \frac{[2(r+m)+1]}{\sin(n\pi r)} \left\{ \sum_{n=\pm 1} \frac{(\gamma_+ \exp[i\pi k])^{(a_0)}}{P_2(1+2s) a_k^{(r)}(n(l), t)} \right\}
\]

\[
\lambda(l) = \left[ (l+\frac{1}{2})^2 - |m|^2 \right]^{1/2}
\]

Note that the above appearance of \(\lambda(l)\) is just a kinematical effect due to the change of the angular momentum operator when monopoles are
Angular momentum is present.

*****) Another nice problem:
analyze the BFKL equation with monopoles.

To do this, one should replace (in the original derivation of the BFKL equation) the standard gluon propagator with the propagator of the gluon in a monopole background.

Substantial changes are expected for low values of $t$. 