1145-VN-2730 **Darleen Perez-Lavin*** (darleenpl@uky.edu), Lexington, KY, and **James B Kowalkowski**, **Stephen Mrenna** and **Sven Leyffer**. *Traveling Circus Particle Model.* Preliminary report.

The strong interaction of particle physics is understood in terms of color. The transition from colored partons to the observed colorless particles (protons, pions, etc.) is currently described by the Lund string model. One aspect of this phenomenon is color reconnections (CR), when long-distance interactions between colored partons force an exchange of color. The CR model posits that these exchanges occur to minimize a free energy called the λ measure. Understanding CR models is important for a precise measurement of the top quark mass.

The CR phenomenon is similar to the traveling salesman problem, but with multiple salesmen; i.e. a traveling circus. . We construct a graph where our quarks are origins, gluons are intermediate cities and antiquarks are destinations with weighted edges. Then we find a set of paths that start at a quark and end at an antiquark, traveling through the gluons. The sum of the weights on each edge in our paths is the λ measure we are minimizing.

We begin by defining our model classically and use standard tools to find solutions. However, our ultimate goal is to map this problem onto a quantum computer. To this end, we map the free energy into an Ising model appropriate for a quantum annealing machine, such as the D-wave. (Received September 25, 2018)