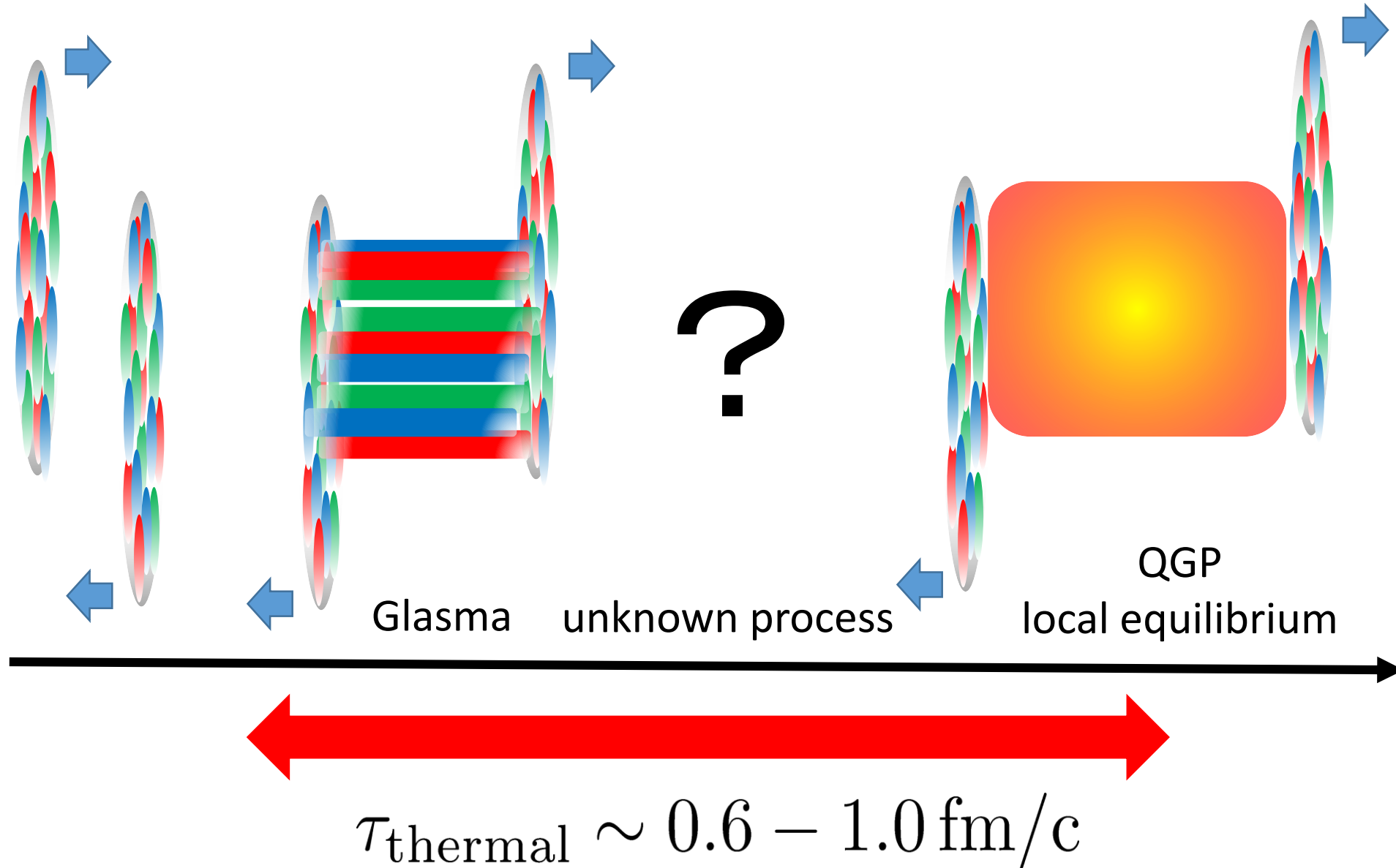


# Plasma Instabilities and Particle Production in Quark-Gluon Plasma

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# Early Thermalization Problem



- FORMALISM

- 2 Particle Irreducible (2PI) effective action
- Closed Time Path (CTP)

*non-equilibrium time evolution*

- INSTABILITIES

We discuss ...

- the Nielsen-Olesen instability.
- **secondary instability** enhanced by the primary NO instability

- CONCLUSIONS

- Exponential growth of unstable modes leads to explosive **particle production**.
- Longitudinal fluctuations of gluon field generate secondary instabilities.  
They cause the **isotropization** of the system.