CHARMONIUM ABUNDANCE AS A PROBE FOR REMNANTS OF CONFINEMENT

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Using a simple analytically solvable model, we argue that it makes charmonium abundance the ideal probe of remnants of confinement, expected to be present at arbitrary high temperature [1,2] but thermodynamically irrelevant, since the nearest neighbor thermal scale $1/T$ is parametrically smaller than the confinement scale.

[1] D. Zwanziger, Phys. Rev. D **69**, 016002 (2004)

[2] G. S. Bali, J. Fingberg, U. M. Heller, F. Karsch, and K. Schilling, Phys. Rev. Lett. **71**, 3059 (1993)

J/Ψ DYNAMICS IN A QUARK-GLUON PLASMA

The rate equations for J/ψ abundance are given by the following equations [3]:

$$\frac{\mathrm{d}N_{J/\psi}}{\mathrm{d}\tau} = -\Gamma(T)N_{J/\psi} + \alpha(T)\frac{N_{c\bar{c}}^2}{V} = -\frac{\mathrm{d}N_{c\bar{c}}}{\mathrm{d}\tau}$$

with

$$\Gamma \sim \lambda_D T \quad \text{and} \quad \alpha \sim \lambda_R \frac{1}{T^2}.$$

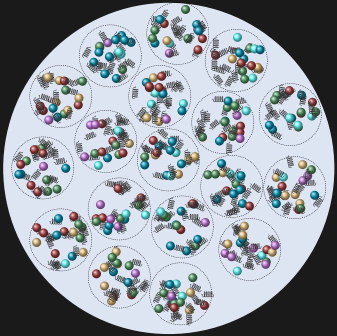
λ_D and λ_R are dimensionless parameters (dissociation and recombination).
$\sigma_{ff\to J/\psi X} << \sigma_{ff\to ccX}$, $N_{J/\psi} << N_{c\bar{c}}$ and the dependence on regeneration on $N_{c\bar{c}}^2$, the regeneration term will soon take over, leading to an enhancement of $N_{J/\psi}$.

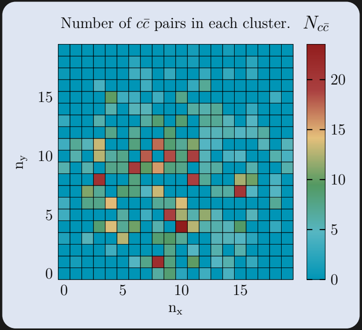
[3] R. L. Thews, M. Schroedter and J. Rafelski, Phys. Rev. C **63**, 054905 (2001)

REMNANTS OF CONFINEMENT

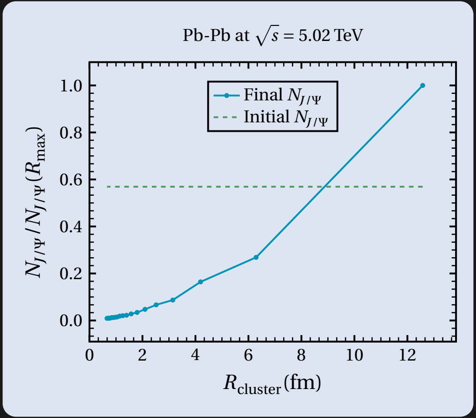
Let us now implement the assumption that charm quarks cannot move beyond a volume of $V_c = R_c^3$.

- One has a "locally" quasi-free gas, however, all clusters of volume V_c are color neutral.
- Solving in each bin of transverse area and summing together will give the final $N_{J/\psi}$, and it will generally be much smaller than if c and $\bar{c}$ are allowed to move around freely.





PRELIMINARY RESULTS



- Calculate R_{AA} as a function of R_c.
- Look for the J/ψ data.