Motivation

- Beam Energy Scan is currently ongoing
- Need to understand the stopping of baryons quantitatively

Model: SMASH

- Hadronic transport approach with geometric collision criterion
- More established hadrons from the Particle Data Group with a mass of up to \( 2 \text{ GeV} \) are included
- Non-equilibrium dynamics are described by effectively solving the relativistic Boltzmann equation
- Continuous formation of particles is mimicked
- Hadronic transport approach with geometric collision criterion

Particle Formation

- Inelastic cross sections via resonance formation and decays at low energies
- Model for string excitation at intermediate energies is introduced and Pythia is used for the fragmentation
- Pythia is directly employed at high energies
- Code and analysis suite publicly available at https://smash-transport.github.io

Conclusions

- String model is introduced and tuned to experimental data from p+p collisions
- Details of particle formation are investigated with respect to their effect on baryon stopping
- Good agreement with proton an pion rapidity spectra over the SPS energy range is achieved
- Full 3D phase space information for all conserved charges is available

Outlook: Initial State Calculations

- Calculation is stopped immediately after nuclei pass through each other
- Thermodynamic quantities are calculated as a starting point for a hydrodynamic evolution

Results for Heavy Ion Collisions

- Transition to a double peak structure with increasing energy reproduced
- Proton yield at low collision energies is slightly overestimated
- Pion production slightly lower than in UrQMD but agrees with data especially for low energies

Results for p+p Collisions

- Model is tuned to new NA61 data of proton-proton collisions

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References