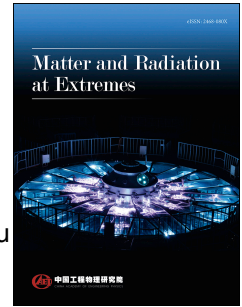


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# Warm Dense Matter Research at HIAF

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## Abstract

The research activities on Warm Dense Matter driven by intense heavy ion beams at the new project High Intensity heavy-ion Accelerator Facility (HIAF) are presented. The ion beam parameters and the simulated accessible state of matter at HIAF are introduced, respectively. The progresses of the developed diagnostics for warm dense matter research including high energy electron radiography, multiple-channel pyrometer, in-situ energy loss and charge state of ion detector are briefly introduced.

**Keywords:** warm dense matter, intense heavy ion beams, HIAF, electron radiography

**PACS codes:** 34.50.Bw; 94.20.Fg; 52.40.Mj; 87.59.B-; 41.75.Lx

## Introduction

Warm Dense Matter (WDM), an intermediate state of matter between solid and plasma, has a density of the same order of magnitude as solid (typically 0.01-100 g/cm<sup>3</sup>), a temperature on the order of a few eV (typically 1-100 eV) and a pressure from ambient to some Mbar. It exists in the lower-temperature portion of the high energy density regime [1]. In this state, the particles are strongly coupled. This means that the energy of the interaction between electrons and nuclei and the kinetic energy of electrons are of the same magnitude. Under the condition of WDM, the

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