

**ALGORITHM FOR CALCULATING EQUATION-OF-STATE
PARAMETERS BASED ON PARTICLE SWARM
OPTIMIZATION AND ITS APPLICATION TO TITANIUM
PLASMA AT HIGH PRESSURES AND TEMPERATURES**

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The purpose of this study is to algorithmize and optimize the determination of the parameters of the model of the equation of state for non-ideal plasma at high pressures and temperatures. An attempt was made to develop an appropriate algorithm for calculating parameters based on the particle swarm method [1].

The essence of this method is the stochastic enumeration of combinations of parameters by the particles of the “swarm” and the exchange of information about the best achieved position by all particles among themselves. The best passed position is the set of parameters at which the deviation from the available experimental data is minimized. The result of the method is the found optimal set of parameters of the equation of state, upon reaching which all particles of the swarm converge at one point in the space of model parameters.

As an example of the use of the developed algorithm, the equation of state of titanium plasma at high pressures and temperatures is presented within the framework of a simple model. The resulting set of parameters was verified using data from shock-wave experiments.

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1. Eberhart R., Kennedy J. // Proc. of the IEEE Int. Conf. on Neural Networks. 1995. V. 4. P. 1942.