

## AUSHANG

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### Einladung zum IKET-Kolloquium

Zeit: Dienstag, 4. November 2014, 15.00 Uhr

Ort: Kolloquiumsraum des IKET, Campus Nord, Bau 419, Raum 104

Referent: Prof. Sergey Lezhnin, Novosibirsk State University, Novosibirsk, Russia

Titel: Numerical and Experimental Study of Boiling Water Jets

Zusammenfassung:

Water at high pressures and temperatures is used in the pipelines of the hydraulic systems in the water-moderated energy reactor plant. During the breakdowns connected with the pipeline rupture the emission of overheated heat carrier takes place, it is accompanied with a sudden drop in pressure in the area of pipeline rupture and the formation of a shock wave in the surrounding environment of the pipeline. The dynamic impact on the surrounding equipment is the matter of the design analysis when determining the safety of a NPP.

The aim of the present work was to experimental and theoretical researches the formation of the boiling water flow from a tank through the nozzles.

Using a model taking into account thermodynamical non-equilibrium of the liquid-vapor mixture the conjugated computation of the formation of shock wave structures at the initial stage and the quasi-stationary two-phase vapor-liquid jets in the space behind the vessel nozzle at next stages was performed. The dynamics of the shock wave formation and its amplitude have been calculated depending on the rupture section opening (time iris). The initial temperature and the water pressure have been varied. The force of the shock wave and quasi-stationary jet impact on a flat solid barrier has been calculated.

A series of experimental studies of the boiling liquid flow from holes of 8-60 mm diameter were conducted. The initial water pressure in the tank was 7-11.5 MPa, water temperature was 160-235C. The method of the flow investigation was based on the quick filming usage with the subsequent digital processing of the obtained image. Characteristic jet velocities, the sequence of various flow phases, the size of the jet were determined.

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gez. T. Schulenberg

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