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DEVELOPMENT OF "ANGARA" PROGRAM: INVESTIGATION AND CONTROL OF TERAWATT INTERNAL ENERGY FLUX INTO IMPLODING MULTILINER COMPOSITIONS

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"Angara" scientific program, being developed in TRINITI, takes the aim to produce soft X-ray intensive source for ICF indirect drive and for dense radiative plasma fundamental physics and applications. An energetic basis of the program is a multiterawatt pulsed power technics. "Angara-5-1" generator produces 3-5 MA at 100 ns in different physical loads in the current experiments.

The problem is being solved by means of multiliner compositions implosion to transform a kinetic energy of external liner, accelerated by the current, into soft X-ray radiation inside of inner liner cavity in the moment of their collision, or to increase abruptly a magnetic energy flux into inner region of the composition, using specific effects of plasma instabilities.

Experimental results on the energy flux control by means of appropriate liner parameters choice will be presented. In double liner composition with external gas liner 150-300 microgram/cm and inner foam liner 250-300 microgram/cm was used. The radiation flux in the inner liner cavity was 1.5-3 TW/cm² in the moment of the liners collision. External X-ray flux was 10 TW/cm² in the moment of the composition total pinch. X-ray pulse front was 1-3 ns in some cases.

Using the current instability of external low mass liner (30-50 microgram/cm), a current ~ 2 MA was switched from the external liner to the inner load-radiator and soft X-ray pulse of ~ 1 TW had the front of 1-2 ns.

Above mentioned modes of the energy flux control were used in triple liner composition with external low mass gas corona-preionizer and two coaxial foam liners. Experimental results referring to the triple composition will be presented as well.