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CONTRACT CRYSTAL GROWTH AND FABRICATION SERVICES

Quarterly Technical Report # 7

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SUMMARY

This program is intended to give the scientists at the Naval Research Laboratory the ability to evaluate new solid state laser crystals. During the seventh quarter of this contract one growth run performed, the eleventh since project start.

CRYSTAL GROWTH

The crystal requested and grown was Erbium Scandium Gallium Garnet (ESGG). The melt composition is listed in Table 1. It was assumed that the distribution coefficients are unity and that the crystal composition will be the same as the melt.

TABLE 1: Composition

Growth Run	Melt composition	Nominal Doping at% (cm^{-3})
NRL-11	$Er_3\ Sc_2\ Ga_3\ O_{12}$	none

The growth conditions are listed in Table 2. The crystal grew well. Some strain and surface cracking exists. The best material is in the center of the boule. No flourescence was observed with a bright fiber optic inspection light or long wave UV source.

TABLE 2: Growth Conditions

Growth Run	Pull Rate mm/Hr	Rotation RPM	Oxygen %	Average Diameter mm	Length at Diam mm	Fraction Crystallized
NRL-11	3	45	1.5	29	55	.16

PLANS FOR NEXT QUARTER

Work in progress includes fabrication and coating of ESGG, Tm:YAG and titanium doped sapphire parts.