IDS120M20to2T5m: 16-cm I.R., 46-cm O.D., 8.6 MW, Optimized Cooling

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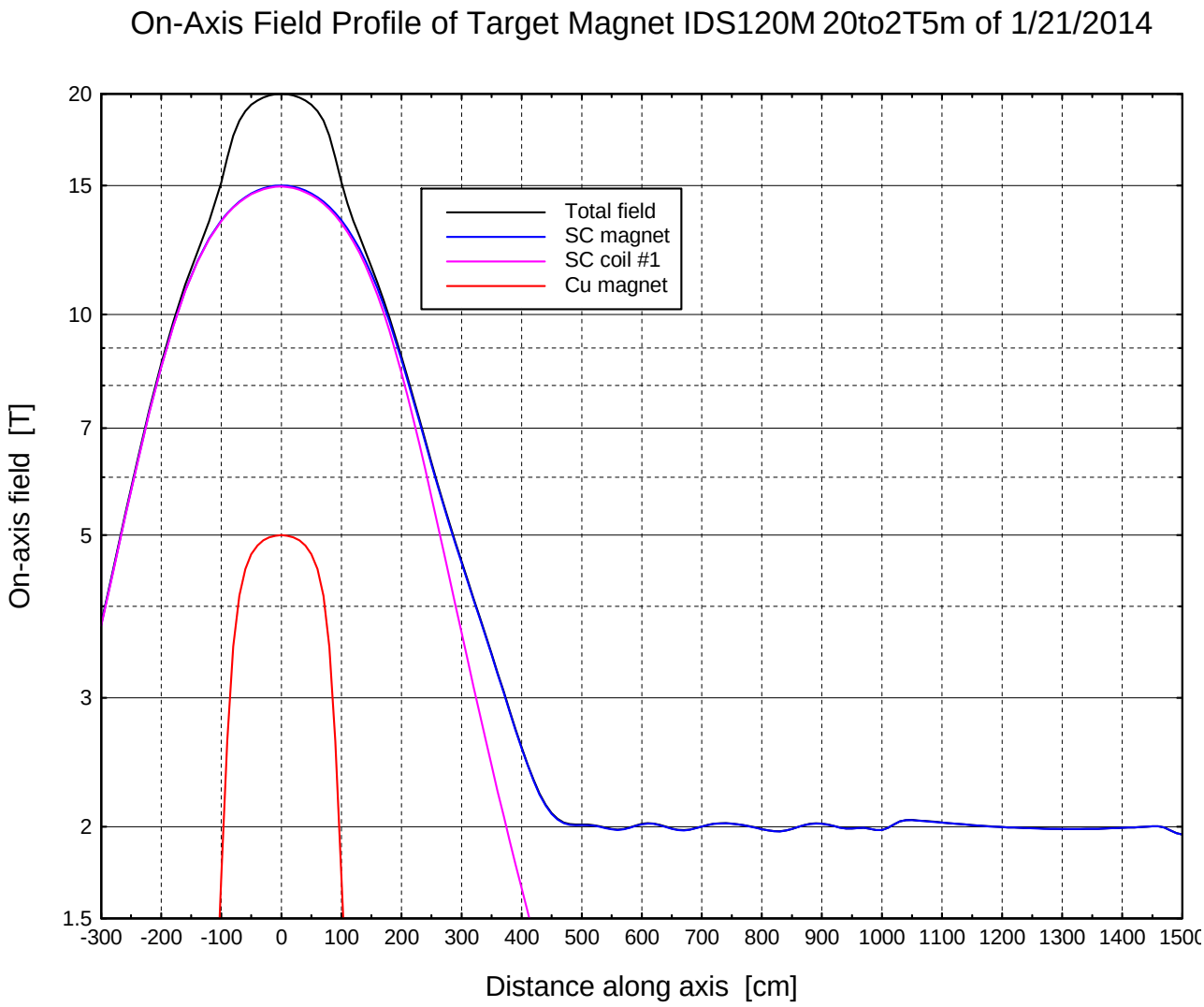

Fig. 1. On-axis field profile of 20-T magnet of 16-cm inner radius. The copper magnet generates 5 T at 8.6 MW with five tightly-nested two-layer coils of mineral-insulated hollow conductor. The conductor is rectangular, with aspect ratio $\Delta z/\Delta r = 2$, optimized in size and cooling-hole diameter to maximize the efficiency dB/dP [T/MW]. The peak hot-spot temperature is 90 ºC with cooling water at 10 ºC, a water-pressure drop of 40 atm, and three hydraulic passages per coil.

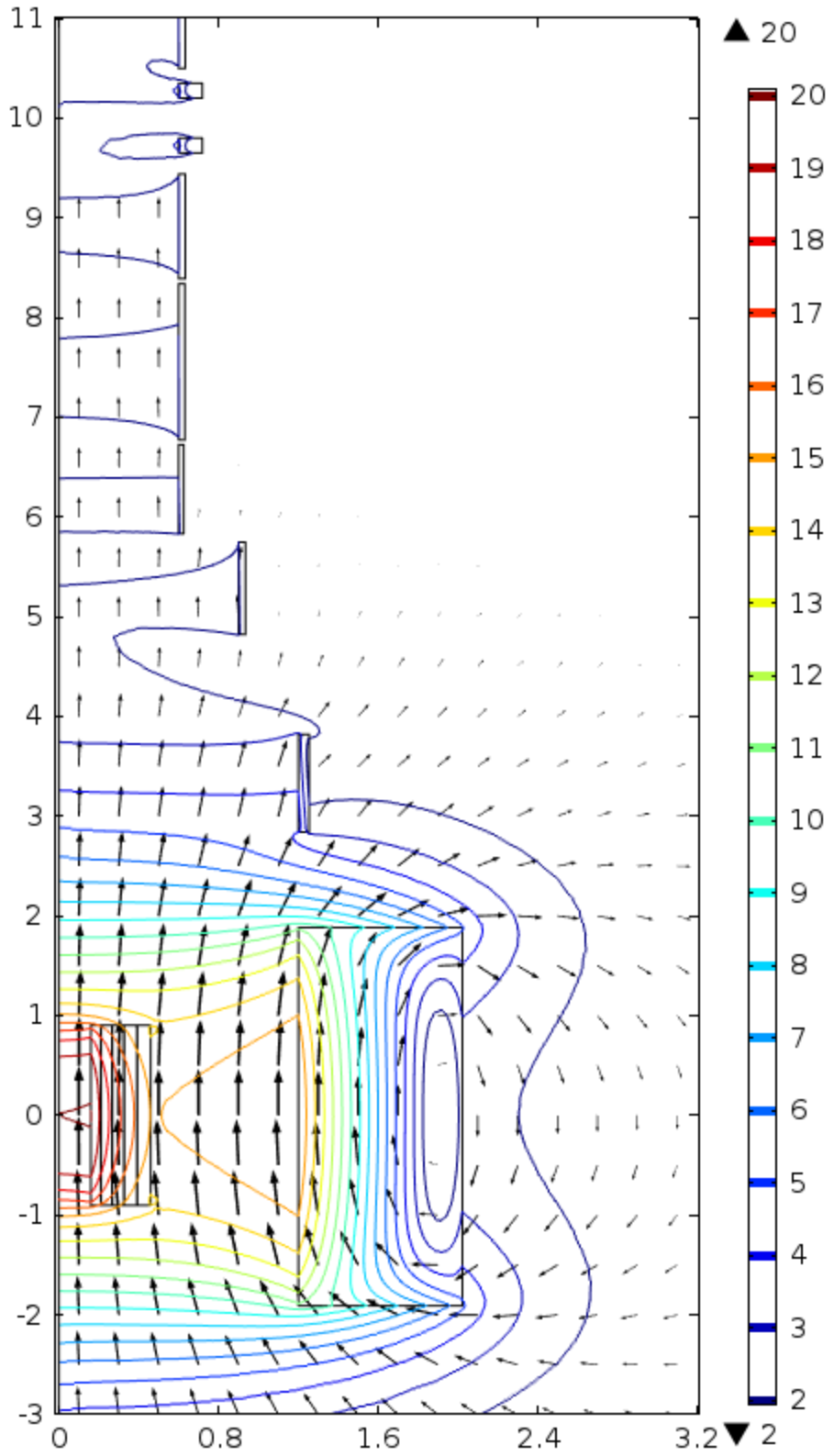

Fig. 2: Coil cross sections and field direction (arrows) and magnitude (color & contours) of Target Magnet of Fig. 1: 20to2T5m2+5.