

Stochastic Cooling System in COSY

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Abstract

The stochastic cooler system in the cooler synchrotron COSY is designed for proton kinetic energies between 0.8 and 2.5 GeV. Fabrication of the mechanical parts of the cooling system is going on. Test results of the prototype measurements as well as data of the active RF-components are presented.

Introduction

The COSY stochastic cooling system consists of a two band RF system from 1-1.8 GHz and 1.8-3 GHz. There are in total foreseen two horizontal and two vertical pickup tanks and one kicker tank per plane, each of the tanks with a length of 2 m [1].

Present Status

All active RF-components are delivered and tested. Some technical data are given below. Mounting of the 6 cooling tanks is going on. Fabrication of the first pickup tank is finished. After the vacuum test the tank will be mounted and tested including all the RF-components.

The RF Components

All active RF-components of the stochastic cooling signal path (Fig. 1) - low-noise preamplifiers, programmable delay lines, medium- and high power amplifiers for both RF-bands are delivered and tested. Fig. 2 shows the 1 dB compression point of the 1.0-1.8 GHz (band 1) and the 1.8-3.0 GHz (band 2) power amplifiers. All components are within the specifications.

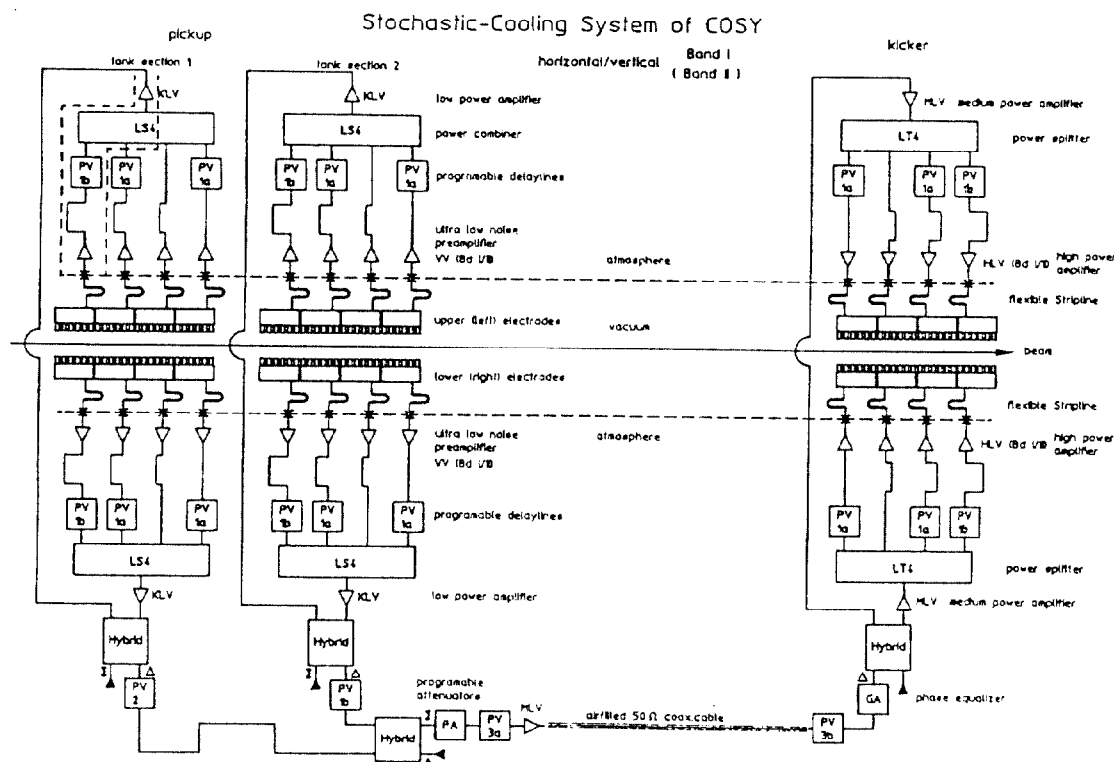
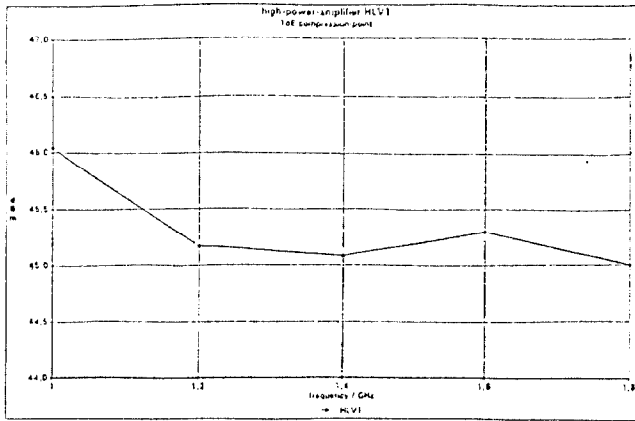
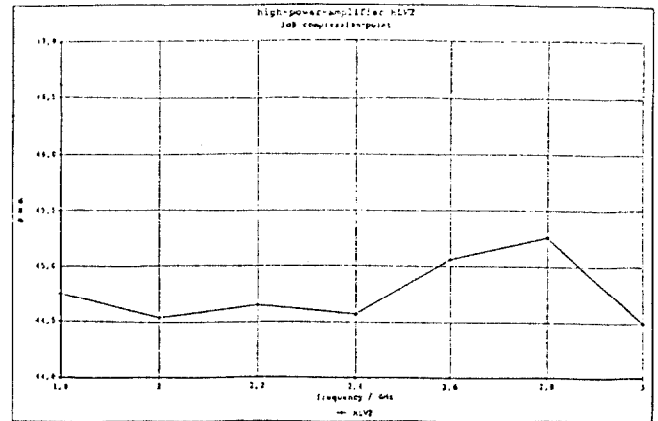


Figure 1: The RF signal path from the pickup electrodes to the kicker electrodes



Band 1: 1.0 - 1.8 GHz



Band 2: 1.8 - 3.0 GHz

Figure 2: The 1dB compression point of the power amplifiers

Mechanical componets

Prototypes of the most sensitive RF-relevant parts - i.e. electrode bars and flexible RF transmission lines - were built and tested before all groups were mounted. Fig. 3 shows the transmission data of the flexible

Outlook:

The first pickup tank is ready for the vacuum test and afterwards an intensive test of all RF-relevant components. The second pickup tank

transmission feedthrough inside the vacuum vessel.

The electrode bars together with the RF feedthroughs have been tested on a separate test bench to measure the coupling between the electrodes and the transmission from the electrode plates to the feedthrough.

is expected to be mounted within this summer. During autumn this year it is scheduled to mount the two pickup tanks into the COSY ring as additional diagnostic tools. The kicker tanks will be ready to the end of the year, so that we expect to have the first tests of our stochastic cooling system in the spring 1995. In summer next year the last pickup tanks will be mounted in the COSY ring, so that the full equipped stochastic cooling system will be available.

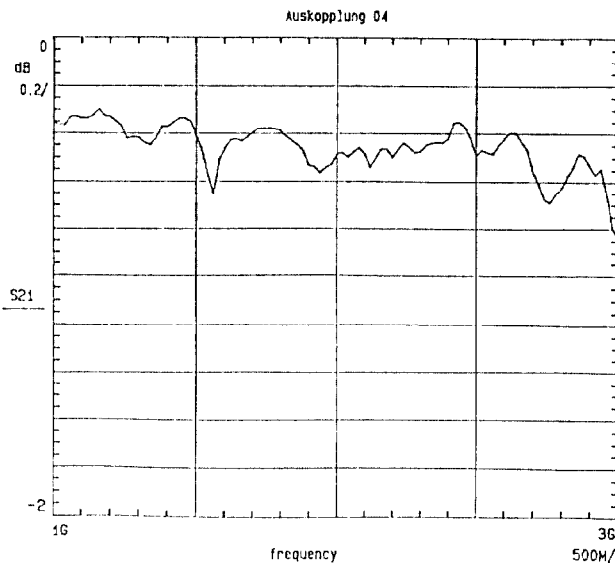


Figure 3: Transmission data for the flexible RF-feedthroughs

References:

- /1/ P. Brittner et al., The Stochastic-Cooling System of COSY, 3rd EPAC, Berlin, 1992
- /2/ P. Brittner et. al., Evaluation and first realization of design goals for the stochastic cooling system, Ann. Rep. 1992, p. 226