Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

**CFD Aided Design and Production of Hydraulic Turbines**[1]
ALPER KAPLAN, HUSEYIN CETINTURK, GIZEM DEMIREL, ECE AYLI, KUTAY CELEBIOGLU, SELIN ARADAG, TOBB University of Economics and Technology, ETU HYDRO RESEARCH CENTER TEAM — Hydraulic turbines are turbo machines which produce electricity from hydraulic energy. Francis type turbines are the most common one in use today. The design of these turbines requires high engineering effort since each turbine is tailor made due to different head and discharge. Therefore each component of the turbine is designed specifically. During the last decades, Computational Fluid Dynamics (CFD) has become very useful tool to predict hydraulic machinery performance and save time and money for designers. This paper describes a design methodology to optimize a Francis turbine by integrating theoretical and experimental fundamentals of hydraulic machines and commercial CFD codes. Specific turbines are designed and manufactured with the help of a collaborative CFD/CAD/CAM methodology based on computational fluid dynamics and five-axis machining for hydraulic electric power plants. The details are presented in this study.

[1]This study is financially supported by Turkish Ministry of Development.

Selin Aradag
TOBB University of Economics and Technology

Date submitted: 10 Jul 2014 Electronic form version 1.4