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技术及应用

上海光源的设备安装技术

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摘要 国家重大科学工程——上海光源工程的主体是一复杂、精密的大科学装置，由成千上万、大小不一的设备组成，其中很多关键元件均应达到亚毫米量级的安装定位精度要求。在工程设计阶段，利用Solid Edge及UG等三维机械设计软件进行元件的设计及虚拟装配，避免了设备之间的相互干涉；在首批设备加工之后，实施了多次模拟安装，以查找设计缺陷，进一步对设计进行优化，为批量生产的批准提供依据；在工程安装阶段，利用激光跟踪仪、关节测量臂等三维准直测量仪器，保证设备之间0.2 mm量级的安装精度，并提前3个月实现获得同步辐射光这一关键工程节点。

关键词 上海光源 虚拟装配 模拟安装 准直测量 激光跟踪仪

分类号

Assembly Technique of Shanghai Synchrotron Radiation Facility

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Abstract As a national scientific engineering project, the main facility of Shanghai Synchrotron Radiation Facility (SSRF) is composed of thousands of components with large or small dimension. Many key devices of them have the requirement of sub-millimeter assembly accuracy. In design stage, the design and virtual assembly of devices were realized by mechanical software Solid Edge and Unigraphics (UG) to avoid potential interference within and among devices. After the first group of components was fabricated, several times of test assembly were carried out to find the design bugs and optimize the design, then batch production could be approved. In installation stage, precise 3D measurement instruments, such as the laser tracker and the articulated arm, were fully utilized to assure about 0.2 mm assembly accuracy between devices, and a key engineering milestone was achieved by acquiring synchrotron light ahead of the schedule about three months.

Key words Shanghai Synchrotron Radiation Facility _ virtual assembly _ test installation _ survey and alignment _ laser tracker

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