

6.634 Nonlinear Optics

'Mission Statement' Assignment

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Mission Statement for a Career in Science Education

I was one of the fortunate that knew from an early age that I wanted to be a scientist in the field of electronics. One of my first childhood recollections in this area is being electrocuted at age 4, attempting to run a train set I found in our basement. I was informed by my petrified father that a transformer was needed to reduce the voltage applied to the tracks to sub-lethal levels. Clearly more study was needed in this area, and there were few avenues for a pre-adolescent growing up in a small town. Library books, disassembling anything I could get my hands on, pestering the hell out of the local TV repair shop and Radio Shack proprietors, and ham radio were the only sources available to satisfy my inquisitiveness.

My basic philosophy today is little changed from that purest form of curiosity which nearly killed me nearly 30 years ago, perhaps with a little pragmatism thrown in. After 10 years as an engineer with a BSEE, I have never quite felt technically fulfilled; there were few times when I haven't been registered for some technical course. As an electrical engineer, I found the type of work I was performing was somewhat routine, even for a recent graduate. In addition, much of the R&D positions were typically filled, with the exception of microelectronics.

By a lucky coincidence, I was introduced to the realm of optical technology; I found it to be closer to 'physics' and also has several areas which are wide open for research. These satisfied my desire to understand fundamental physical phenomena, and select and work on a technology 'from the ground up'. Another attractive feature in optics is the relative ease which the transformation of 'simple' theory to physically simple and elegant devices and systems can be accomplished. For example, Maxwell's equations and the Sagnac effect have been known for some time, which made the optical gyroscope possible in theory. The invention of laser and optical fiber, which occurred in the year of my birth, has greatly facilitated the construction of practical fiber optic gyroscopes. This revolution in laser and guided-wave technology has permitted a Sagnac interferometer to be constructed with a handful of simple components, with subHertz sensitivity out of 20 THz, i.e. $<1:10^{14}$.

I feel that I have a stake in this optoelectronics revolution, and hope to contribute to further advancement of the state-of-the-art, and the benefits to society that will result. Recent events has shown optics to have been a fortuitous career choice, with the downturn in the military and computer electronics markets. In this manner my choice of an emerging technology area, as dictated by my curiosity, has served me well. The ultimate goal for my career is to teach graduate-level optics, or have a Professor-like position in industry or government. In this capacity I hope to multiply the learning I have done by satisfying other's curiosity, repaying those who were patient and willing to spark mine.