Appendix 1

The very first such account is a conference report entitled „Optical Microemission Stimulated by a Ruby Laser“ presented by Breech and Cross [BrC62] at the International conference on Spectroscopy held at the University of Maryland in June 1962. A focused ruby laser was used to vaporize and excite atoms from solid surfaces. The photon spectrum was dispersed and used to characterize the elements composing the surface. This paper began the field of laser microprobe emission spectroscopy, which was the first real application of laser ablation. The second (recorded) conference abstract in the field of laser ablation described experiments by Linlor [Lin62] at Hughes Research Laboratories. In a talk entitled „Plasmas produced by Laser Bursts“ given at the American Physical Society Summer Meeting at the University of Washington in August 1962, Linlor ushered in an era of studying the physical mechanisms of laser ablation by describing measurements on the energy of ejected ions. Reports followed describing photoelectrons [Mur1963] or laser induced ultrasounds [Whi63]. Details of the first observed phenomena and pioneering experiments performed during the sixties may be found in the book by Ready [Rea71] entitled „Effects of High-Power Radiation“. The sixties represent the starting of both theoretical and experimental studies on laser ablation. The basic analyses on electrons, ions, neutrals, clusters and photons, as well as the first VUV and X-ray emissions were measured than. Another milestone of the sixties was the first suggestion of laser fusion [BaK1964]. The seventies decade represented a time of expanded use of laser ablation for microanalyses and also more detailed studies of the physics of ablation. Much of this research was driven by improvements in laser technology. Mass spectrometry and optical emission spectroscopy microanalyses remained the major application of laser ablation. The growth of literature on laser ablation in the eighties has been explosive, 5-10 times more since 1985 than the total of all papers published in previous years. This growth was based on several factors: the expansion and integration of laser technology into virtually every scientific laboratory and the increased number and importance of the various applications. The technique of laser ablation could be characterized as an „answer in search of a question“ [Mil94]. The „questions“ multiplied rapidly in the eighties and the scientific community responded in force. Laser technology was pushed to new limits, ps pulses became common and sub-ps pulses emerged and the wavelength range was expanded as well as new developments in acquisition and analyzing techniques. But, undoubtedly, laser ablation has been boosted by materials science, namely the advent of high T_c

superconductors, the improvements in thin film deposition techniques and the observation that stoichiometric mass transfer between the irradiated sample and collector is possible in inert or reactive laser ablation. The eighties meant also a spread of lasers used in biology (microanalyses of biomolecules) and medicine, in surgery or in the ablation of biological tissues as well as in biologically compatible materials. New techniques, new areas have appeared or have been extended: cluster studies, matrix assisted mass spectrometry, X-ray lasers. In the late eighties, beginning of nineties another driving force for laser ablation was manifested in the field of micron and submicron modifications. All these applications matured in the nineties, but the basic fingerprint of the nineties: laser assisted studies on the electronic time scale, the competition for producing few optical cycles laser pulses with new promises in materials structuring and 3D-optical memory and submicron controlled modifications, fast processes studies, short X-ray pulses are still to be developed or improved.