# Master Thesis Progress and Plan

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| Month | April | | | May | | | | June | July | August |
|---|---|---|---|---|---|---|---|---|---|---|
| Week | 3 | 4 | 5 | 1 | 2 | 3 | 4 | | | |
| Thesis | | | | | | | Defense | | | |
| Research | | | | | | | Defense | | | |
| Military Service | Draft Notice | | | | | | | | Draft Notice | Call-up |
| Job Search for 전문연구요원 | | | | | | | | | | |

- Title: Bunch Length Modulation Using Higher Harmonic Cavities – Introducing a new type of Variable Pulse Length Storage Ring (VSR) (*too long …*)

- Contents

  1. Introduction
  2. Concepts of Beam dynamics for RF system
     2.1. Longitudinal Equation of Motion
     2.2. The synchrotron Hamiltonian
     2.3. Liouville's theorem
     2.4. Equilibrium RMS momentum spread
     2.5. RMS bunch length
     2.6. Touschek Lifetime
  3. RF system with a Higher Harmonic Cavity
     3.1. Higher Harmonic Cavities
     3.2. Flat Potential Conditions
     3.3. RMS bunch length

  4. RF system with two Higher Harmonic cavities
     4.1. Flat Potential Conditions
     4.2. Bunch lengthening factor for integer $m_1, m_2$
  5. Variable pulse length Storage Ring (VSR)
     5.1. Alternating bunch scheme
     5.2. Bunch lengthening VSR
  6. Conclusion
  Appendix
  Bibliography
  요약문
  감사의 글
  Curriculum Vitae

- *Not included* : amplitude-dependent synchrotron tune, phase/voltage modulation, phase/voltage modulation with HHC, …

- Multi-bunch simulation for 3HC in PLS-II

- Multi-bunch simulation for VSR in PLS-II

$\}$ to obtain bunch lengths in non − uniform fill pattern

- Action-angle variable for VSR (TBD)