## Contents

1 **Introduction**  

2 **Concepts of Particle Magnetism**  
   2.1 Basic Principles  
      2.1.1 The Idea of an Intrinsic Angular Momentum  
      2.1.2 Interaction with Magnetic Fields  
   2.2 Polarization  
      2.2.1 Polarization at Thermal Equilibrium  
      2.2.2 Dynamic Nuclear Polarization (DNP)  
   2.3 Detection of Particle Magnetism  
      2.3.1 Nuclear Magnetic Resonance (NMR)  
      2.3.2 Electronic Paramagnetic Resonance (EPR)  

3 **Ammonia as a Polarizable Target Material**  
   3.1 Ammonia – a Portrait  
   3.2 Ammonia Target – Pro vs. Contra  
   3.3 Production of an Ammonia Target  
      3.3.1 Preparation of Solid Ammonia  
      3.3.2 DNP-Activation of Ammonia  
   3.4 Radiation Hardness of Ammonia Targets  

4 **The COMPASS Experiment**  
   4.1 Intention of COMPASS  
   4.2 COMPASS Target System  
   4.3 Future of COMPASS – COMPASS II  
      4.3.1 Drell-Yan Measurement  
      4.3.2 Changes at COMPASS II  
   4.4 Radiation Exposure during Drell-Yan  

5 **Behavior Studies of the Ammonia Target**  
   5.1 Paramagnetic Centers  
   5.2 Polarization Measurements in Bochum  
      5.2.1 Polarization and Relaxation Behavior  
      5.2.2 Long-Term Behavior  
   5.3 Polarization Measurements at COMPASS  
      5.3.1 Shift of the Optimal Microwave Frequencies