CLAIMS

1. A wireless system comprising:

a plurality of base station (BTS) antennas;

a plurality of subsets of the BTS antennas;

a plurality of user equipment (UE) antennas;

wherein each subset of BTS antennas transmits to or receives from at least one UE antenna; and

at least two subsets of BTS antennas having at least one BTS antenna in common and at least one BTS antenna not in common, the subsets of BTS antennas concurrently transmitting or receiving within the same frequency band; and

wherein one or a plurality of UE antennas move and the subsets of BTS antennas are dynamically reconfigured to adjust for the motion of the UE antennas.

2. The system as in claim 1 wherein reconfiguring comprises dynamically removing or adding BTS antennas to the subsets of BTS antennas.

3. The system as in claim 1 wherein reconfiguring comprises dynamically assigning the subsets of BTS antennas to the respective UE antennas based on Doppler velocity of the UE antennas.

4. The system as in claim 3 wherein the subset of BTS antennas yielding the minimum Doppler velocity is assigned to every UE antenna to improve link quality.

5. The system as in claim 1 wherein the BTS antennas or the UE antennas measure channel characterization data for one or a plurality of communication channels among them.

6. The system as in claim 5 wherein each subset of BTS antennas is assigned to at least one UE antenna based on the channel characterization data.

7. The system as in claim 5 wherein the channel characterization data comprises the channel state information.

8. The system as in claim 5 wherein the channel characterization data is used for precoding a plurality of data streams to be received concurrently by the UE antennas.

9. The system as in claim 8 wherein precoding comprises computing a weight vector for every UE antenna, the weight vector for one UE antenna being obtained from one or a plurality of singular vectors of the null subspace of the matrix containing the channel characterization data for the other UE antennas.

10. The system as in claim 9 wherein the weight vector comprises a linear combination of the singular vectors.

11. The system as in claim 9 wherein the weight vector comprises the singular vector selected to optimize the quality of the data stream received by the UE antenna.

12. The system as in claim 8 wherein precoding comprises zero-forcing (ZF), minimum mean squared error (MMSE), block diagonalization (BD), or singular value decomposition (SVD) precoding.

13. The system as in claim 8 wherein precoding is used for transmitting radio

frequency (RF) energy while creating points of effectively zero RF energy at one or the plurality of UE antennas.

14. The system as in claim 13 wherein the RF energy transmitted via precoding is an interfering signal except at the points of zero RF energy.

15. The system as in claim 13 wherein effectively zero RF energy comprises a level of interference that is sufficiently low such that the plurality of UE antennas can demodulate their respective data streams successfully.

16. The system as in claim 13 wherein the precoding weight vector comprises one or a plurality of singular vectors of the null subspace of the matrix containing the channel characterization data of one or the plurality of UE antennas.

17. The system as in claim 8 comprising a multi-carrier transceiver wherein the precoding is computed only for a subset of subcarriers and the remaining precoding weight vectors are derived via interpolation techniques.

18. The system as in claim 8 wherein precoding is used to compensate for signal distortions due to imperfections of the RF chains.

19. The system as in claim 8 wherein precoding comprises utilizing the channel characterization data obtained from the UE antennas via feedback.

20. The system as in claim 8 wherein precoding comprises utilizing the channel characterization data obtained at the BTS antennas by exploiting uplink/downlink channel reciprocity.

21. The system as in claim 5 wherein the channel characterization data is

used to demodulate a plurality of data streams received simultaneously at the BTS antennas over the uplink channels from the UE antennas.

22. The system as in claim 21 wherein demodulating the data streams comprises using linear (e.g., ZF, MMSE) or non-linear (e.g., maximum likelihood) receivers.

23. The system as in claim 5 wherein link adaptation (LA) is used to dynamically adjust the modulation and coding schemes (MCSs) of the data streams for the plurality of UE antennas, depending on the changing channel conditions.

24. The system as in claim 23 wherein the LA adjusts the MCSs based on the channel characterization data estimated in time, frequency and space domains.

25. The system as in claim 5 wherein the channel characterization data is used for per-BTS-antenna power control, comprising computing one or a plurality of power scaling factors to adjust power transmitted from the BTS antenna.

26. The system as in claim 8 wherein the channel characterization data is used for per-UE-antenna power control, comprising computing one or a plurality of power scaling factors to adjust power transmitted to or from the UE antennas over the downlink or uplink channels, respectively.

27. The system as in claim 26 wherein the power scaling factors are multiplied by the precoding weight vectors.